SPECIFICATIONS AND DRAWINGS FOR 7.6/13.2 KV LINE CONSTRUCTION

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For the:

NATIONAL ELECTRIFICATION ADMINISTRATION

REPUBLIC OF THE PHILIPPINES

Based on U.S. D.A., REA Form 805, Revised in 1976 by

STANLEY CONSULTANTS, INC.

NEA FORM 8-A-1
MAY, 1973
REVISED 1976

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SPECIFICATIONS AND DRAWINGS FOR 7.62 / 13.2 Kv. LINE CONSTRUCTION

NATIONAL ELECTRIFICATION ADMINISTRATION

SPECIFICATIONS FOR CONSTRUCTION

1. General

All construction work shall be done in a thorough and workmanlike manner in accordance with the Staking Sheets, Plans and Specifications, and the Construction Drawings.

2. Distributing Poles

In distributing the poles, large, choice, close-grained poles shall be used for transformer, deadend, angle, and corner poles.

3. Pole Setting

The minimum depth for setting poles shall be as follows:

Length of Poles (Feet)	Setting in Soil (Feet)	Setting in All Solid Rock (Feet)
20	4.0	3.0
25	5.0	3.5
30	5.5	3.5
35	6.0	4.0
40	6.0	4.0
45	6.5	4.5
50	7.0	4.5
55	7.5	5.0
60	8.0	5.0

"Setting in Soil" specifications shall apply:

a. Where poles are to be set in soil

b. Where there is a layer of soil of more than two (2) feet in depth over solid rock.

c. Where the hole in solid rock is not substantially vertical or the diameter of the hole at the surface of the rock exceeds approximately twice the diameter of the pole at the same level.

"Setting in All Solid Rock" specifications shall apply where poles are to be set in solid rock and where the hole is substantially vertical, approximately uniform in diameter and large enough to permit the use of tamping bars the full depth of the hole.

Where there is a layer of soil two (2) feet or less in depth over solid rock, the depth of the hole shall be the depth of the soil in addition to the depth specified under "Setting in All Solid Rock" provided, however, that such depth shall not exceed the depth specified under "Setting in Soil".

On slopping ground, the depth of the hole always shall be measured from the low side of the hole.

Poles shall be set so that alternate crossarm gains face in opposite directions, except at terminals and deadends where the gains of the last two poles shall be on the side facing the terminal or deadend. On unusually long spans, the poles shall be set so that the crossarm comes on the side of the pole away from the long span. Where pole top pins are used, they shall be on the opposite side of the pole from the gain, with the flat side against the pole.

Poles shall be set in alignment and plumb except at corners, terminals, angles, junctions, or other points of strain, where they shall be set and raked against the strain so that the conductors shall be in line.

Poles shall be raked against the conductor strain not less than one inch for each ten feet of pole length nor more than three inches for each ten feet of pole length after conductors are installed at the required tension.

Pole backfill must be thoroughly tamped the full depth. Excess dirt must be banked around the pole.

4. Grading of Line

When using high poles to clear obstacles such as buildings, foreign wire crossings, railroads, etc., there shall be no upstrain on pin-type insulators in grading the line each way to lower poles.

5. Guys and Anchors

Guys shall be placed before the conductors are strung and shall be attached to the pole as shown in the Construction Drawings.

All anchors and rods shall be in line with the strain and shall be so installed that approximately six inches of the rod remain out of the ground. In cultivated fields or other locations, as deemed necessary, the projection of the anchor rod above earth may be increased to a maximum of 12 inches to prevent burial of the rod eye. The backfill of all anchor holes must be thoroughly tamped the full depth.

When a cone anchor is used, the hole, after the anchor has been set in place, shall be backfilled with coarse crushed rock for two feet above the anchor, tamping during the filling with the remainder of the hole to be backfilled and tamped with dirt.

6. Locknuts

A locknut shall be installed with each nut, or other fastener on all bolts or threaded hardware such as insulator pins, upset bolts, double arming bolts, etc.

7. Conductors

Conductors must be handled with care. Conductors shall not be tramped on nor run over by vehicles. Each reel shall be examined and the wire shall be inspected for cuts, kinks, or other injuries. Injured portions shall be cut out and the conductor splied. The conductors shall be pulled over suitable rollers or stringing blocks properly mounted on pole or crossarm if necessary to prevent binding while stringing.

The neutral conductor should be maintained on one side of the pole (preferably the road side) for tangent construction and for angles not exceeding 30 degrees.

With pin-type insulators the conductors shall be tied in the top groove of the insulator on tangent poles and on the side of the insulator away from the strain at angles. Pin-type insulators shall be tight on the pins and on tangent construction the top groove must be in line with the conductor after tying in.

For neutral and secondary conductors on poles, insulated brackets (Material Item da) may be substituted for the single and double upset bolts on angles of 0^{o} to 5^{o} in locations known to be subject to considerable conductor vibration.

All conductors shall be cleaned thoroughly by wire bushing before splicing or the installation of connectors, clamps or tapping armor rods. A suitable inhibitor shall be used on aluminum conductors before splicing, before applying connectors, clamps or before installing tapping armor rods.

8. Splies and Deadends

Conductors shall be spliced and deadended as shown on the construction Drawings. There shall be not more than one splice per conductor in any span and splicing sleeves shall not be located near conductor support. Maintain ten feet or more separation between the splice and the conductor support. No splices shall be located in Grade B crossing spans and preferably not in the adjacent spans.

9. Taps and Jumpers

Jumpers and other leads connected to line conductors shall have sufficient slack to allow free movement of the conductors. Where slack is not shown on the Construction Drawings it will be provided by at least two

bends in a vertical plane, or one in a horizontal plane, or the equivalent. In areas where aeolian vibration occurs, special measures to minimize the effects of jumper breaks shall be used as specified.

All leads on equipment such as transformers, reclosers, etc., shall be a minimum of #6 copper conductivity.

10. Hot-Line Clamps and Connectors

Connectors and hot-line clamps suitable for the purpose shall be installed as shown on Guide Drawings. On all hot-line clamp installations, the clamp and jumper shall be so installed so that they are permanently bonded to the load side of the line, allowing the jumper to be de-energized when the clamp is disconnected. This applies in all cases, even where the line layout is such that the tap line is in actuality the main back to the power source.

Do not install hot-line clamps directly to ACSR conductors. Use tapping armor rods or tap saddles. Before installing hot line clamps to the surface of tapping armor rods thoroughly clean by wire bushing and apply a suitable inhibitor to the area of the tapping armor rod coming into contact with the hot-line clamp.

11. Lightning Arrester Gap Settings

The external gap electrodes of lightning arresters, combination arrester cutout units, and transformer mounted arresters shall be adjusted to the manufacturers' recommended spacing. Care shall be taken that the adjusted gap is not disturbed when the equipment is installed.

12. Conductor Ties

Ties shall be in accordance with Construction Drawings. Hot-line ties shall not be used at Grade "B" crossings.

13. Sagging of conductors

Conductors shall be sagged in accordance with the conductor manufacturers' recommendations. All conductors shall be sagged evenly. The air temperature at the time and place of sagging shall be determined by a certified etched glass thermometer.

The sag of all conductors after stringing shall be in accordance with the conductor manufacturers' recommendations, except that a maximum increase of three inches of the specified sag in any span will be acceptable. However, under no circumstances will a decrease in the specified sag be allowed.

14. Secondaries and Service Drops

Secondary conductors may be bare or covered wires or multi-conductor service cable. The conductors shall be sagged in accordance with the manufacturers' recommendations.

Conductors for secondary underbuild on primary lines will normally be bare except in those instances where prevailing conditions may limit primary span lengths to the extent that covered wires or service cables may be used. Service drops shall be covered wire or service cable.

Secondaries and service drops shall be so installed as not to obstruct climbing space. There shall not be more than one splice per conductor in any span, and splicing sleeves shall not be located near the conductor support. Maintain ten feet or more separation between the splice and the conductor support. Where the same covered conductors or service cables are to be used for the secondary and service drop, they may be installed in one continuous run.

15. Grounds

Ground rods shall be driven in undisturbed earth in accordance with the Construction Drawings. Where aluminum ground wire is used, it must be terminated above ground at a galvanized ground rod or spliced by a compression connecton to a copper or steel ground wire extension to the ground rod, of which the top of the ground rod shall be 12 inches or more below the surface of the earth. The ground wire shall be attached to the rod with a clamp and secured to the pole with staples. The staples on the ground wire shall be spaced two feet apart except for a distance of eight feet above the ground rod and eight feet down from the top of the pole where they shall be six inches apart.

All equipment shall have at least two connections from the frame, case or tank to the multi-grounded neutral conductor.

The equipment ground, neutral wires, and lightning-protective equipment shall be interconnected and attached to a common ground wire.

16. Clearing Right-of-Way

In preparing the right-of-way, trees shall be removed, underbrush cleared and trees trimmed so that the right-of-way shall be clear from the ground up and of the width required. Trees fronting each side of the right-of-way shall be trimmed symmetrically unless otherwise specified. Dead trees beyond the right-of-way which would strike the line in falling shall be removed. Leaning trees beyond the right-of-way which would strike the line in falling and which would require topping if not removed shall either be removed or topped except that shade fruit, or ornamental trees shall be trimmed and not removed unless otherwise authorized.

INDEX OF CONSTRUCTION DRAWINGS

Single-Phase:

A1	0° to 5° angle, single primary support
A1-1	0° to 5° angle, double primary support
A2	Maximum transverse loading - 500 lbs./pin (5° to 30° maximum angle)
A3	30° to 60° angle
A4	60° to 90° angle
A5	Deadend (single)
A5-1,A5-2, A5-2A	Single phase tap
A5-3,A5-4	Single phase tap
A6	Vertical deadend (double)
A7,A7-1	Crossarm construction - deadend (single)
A8	Crossarm construction - deadend (double)
A9	Crossarm construction - double line arm
A9-1	Crossarm construction - single line arm
A14,A15	Sidearm construction - single phase
A22	Crossarm construction - single phase junction at 0° to 5°

Two-Phase:

B1	Crossarm construction - 0° to 5° angle, single primary support
B1	Crossarm construction - double primary support at 0° to 5° angle
B2	Crossarm construction - double primary supports, maximum transverse loading 500 lbs./pin. (5° to 30° maximum angle)
B3,B3A	Vertical construction - 30° to 60° angle
B4-1,B4-1A	Vertical construction - 60° to 90° angle
B5-1,B5-1A	Vertical construction - deadend (single)
B7,B7-1	Crossarm construction - deadend (single)
B8	Crossarm construction - deadend (double)
B9	Crossarm construction - double line arm
B9-1	Crossarm construction - single line arm
B9-2	Crossarm construction - double line arm
B9-3	Crossarm construction - single line arm
B14,B15	Sidearm construction - two phase
B22	Crossarm construction - single phase junction at 0° to 5° angle

Three-Phase:

C1	Crossarm construction - single primary support at 0° to 5° angle
C1-1	Crossarm construction - double primary support at 0° to 5° angle

C1-2	Crossarm construction -	0° to 2° angle (large conductors)
C1-3	Crossarm construction -	double primary support, 0° to 5° angle (large conductors)
C1-4	Crossarm construction -	2° to 5° angle (large conductors)
C2	Crossarm construction -	double primary support, maximum transverse loading 500 lbs/pin, 5° to 30°angle.
C2-1	Crossarm construction -	double primary support, maximum transverse loading, 750 lbs./pin, 5° to 30°angle.
C2-2	Crossarm construction -	double primary support (large conductors) maximum transverse loading - 1000 lbs./pin, 5° to 30° maximum angle.
C3	Vertical construction -	30° to 60° angle
C3-1	Vertical construction -	10° to 20° angle (large conductors)
C4-1	Vertical construction -	60° to 90° angle
C5-1	Vertical construction -	deadend (single)
C7,C7-1	Crossarm construction -	deadend (single)
C8	Crossarm construction -	deadend (double)
C8-1	Crossarm construction -	deadend (double)
C8-3	Crossarm construction -	deadend (double) (large conductors with unbalanced loads)
C9	Crossarm construction -	double line arm
C9-1	Crossarm construction -	single line arm
C9-2	Crossarm construction -	double line arm, 0° to 50° (large conductors)
C9-3	Crossarm construction -	single line arm (large conductors)
C14, C15	Sidearm construction -	three-phase
C22	Crossarm construction -	single phase junction at 0° to 5° angle
C24	Crossarm construction -	2-phase junction at 0° to 5° angle

Three-Phase, Double Circuit:

DC-C1	Crossarm construction -	single primary support at 0° to 5° angle (2 crossarm type).
DC-CIA	Crossarm construction -	single primary support at 0° to 5° angle (3 crossarm type)
DC-CIB	Crossarm construction -	single primary support w/ overhead neutral at 0° to 5° (2 crossarm type)
DC-C1-1A	Crossarm construction -	double primary support at 0° to 5° angle (3 crossarm type)

DC-C2	Crossarm construction - double primary support at 0° to 5° angle (2 crossarm type)
DC-C2-1	Crossarm construction - 5° to 30° angle (2 crossarm type)
DC-C3	Vertical construction - 30° to 60° angle
DC-C4-1	Vertical construction - 60° to 90° angle
DC-C8	Crossarm construction - deadend (double) (2 crossarm type)
DC-C25	Crossarm construction - 3 phase tap at 0° to 5° angle (2 crossarm type)

Guy Assemblies:

E1-1, E1-2, E1-3	Single down guy, through-bolt type
E2-1, E2-2, E2-3	Single overhead guy, through-bolt type
E3-2, E3-3, E-10	Single down guy, wrapped type
E4-2, E4-3	Single overhead guy, wrapped type
E5-1, E5-2	Deadend guy, crossarm construction
E6-2, E6-3	Double down guy
E7-2, E7-3	Three down guys (large conductors)
E8-2, E8-3	Four down guys (large conductors)
E1, E2	Single loop guy, wrapped type

Anchor Assemblies:

F1-1 to F1-3	Line anchor assemblies
F2-1 to F2-4	Log anchor assembly
F5-1, F5-2, F5-3	Rock anchor assemblies

Transformer Assemblies:

G9, G65, G105

Single phase transformer at 1-phase tangent

- G9 - Conventional transformer with tank mounted cut-out and arrester
- G65- Coventional transformer with double gap and internal fuse
- F105-Self protected transformer

G10, G66 G106

Single phase transformer at deadend

- G10 -Conventional transformer with tank mounted cutout and arrester
- G66 -Conventional transformer with double gap and internal fuse
- G106-Self protected transformer

G39, G67 G136	Single phase transformer on 3-phase circuit: G39 - Conventional transformer with tank mounted cut-out and arrester. G67 - Conventional transformer with double gap and internal fuse G136 - Self protected transformer
G210	Two transformers, cluster-mounted, open wye, for 240 volt power loads
G310	Three transformers, cluster-mounted, ungrounded wye delta, for 240/480 volt power loads.
G311	Three transformers, cluster-mounted, three-wire, grounded delta, for 240 or 480 volt power load.
G312	Three transformers, cluster-mounted, four wire, wye grounded wye, for 240/416 volt power load.

Secondary Assemblies:

J2, J3, J4, J21, J22, J31, J32	Secondary rack assembly
J5 to J15	Secondary assemblies
J20	Guide for installation of secondary underbuild.

Service Assemblies:

K9, K9C	Service Assemblies
K10, K11, K12, K13	Service Assemblies
K14, K15	Service Assemblies
K10C, K11C, K12C, K13C	Service Assemblies
K14C, K15C	Service Assemblies

Miscellaneous Assemblies:

M2-1, M2-11	Grounding assembly - ground rod type
M2-1A, M2-11A	Grounding assembly - ground rod type
M2-2, M2-12	Pole-protection assembly - butt type
M2-9	Pole-top protection assembly
M2-15	Grounding assembly - ground rod type for sectionalizing air break switch
M3-1, M3-4	One sectionalizing fuse cut-out
M3-10, M3-41	One sectionalizer or oil circuit recloser
M3-11, M3-12	Two or three sectionalizing oil circuit reclosers.

M3-11A, M3-12A	Two or three sectionalizing oil circuit reclosers.
M3-15	Sectionalizing air break switch
M5-1 to 8	Miscellaneous primary assemblies
M5-9 to 16	Miscellaneous primary assemblies
M5-17 to 24	Miscellaneous primary assemblies

Regulators:

M7-11	One voltage regulator assembly, pole mounted
M7-14	Three voltage regulators, platform mounted

Metering Assembly Guide Drawings:

M8-6	Secondary metering, three phase 240/480 volts, 4 wire delta
M8-9	Yard pole meter installation, pump service carried underground
M8-10	Yard pole meter installation, all building services carried underground
M8-11	Secondary metering, three phase, 120/208 volts, 4-wire ground wye
M8-12	Secondary metering, three phase 240 volts, 3-wire corner grounded delta
M8-15	Primary metering, three phase, 4-wire star
M8-16	Secondary metering, single phase at rural dwelling.

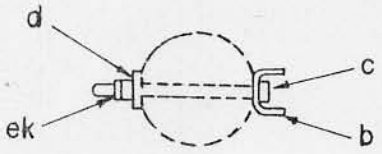
Capacitor Assemblies:

M9-11	Single-phase capacitor assembly
M9-12, M9-13	Two or three phase capacitor assembly

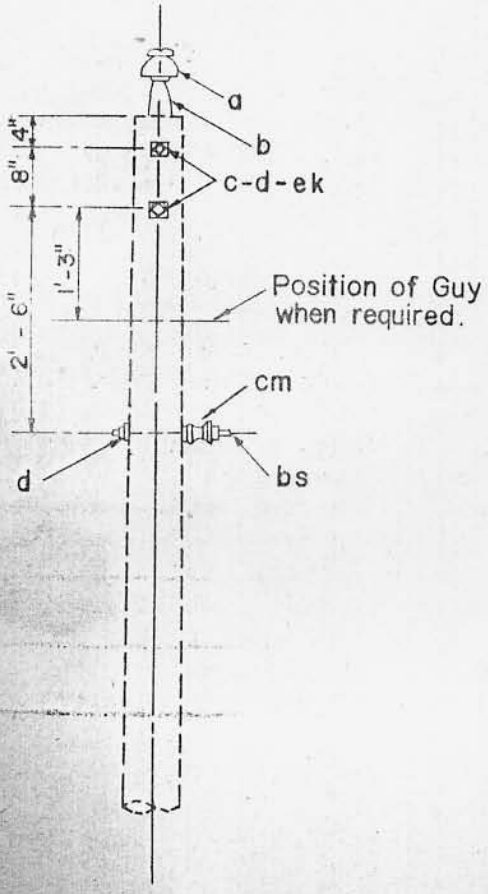
Guide Drawings:

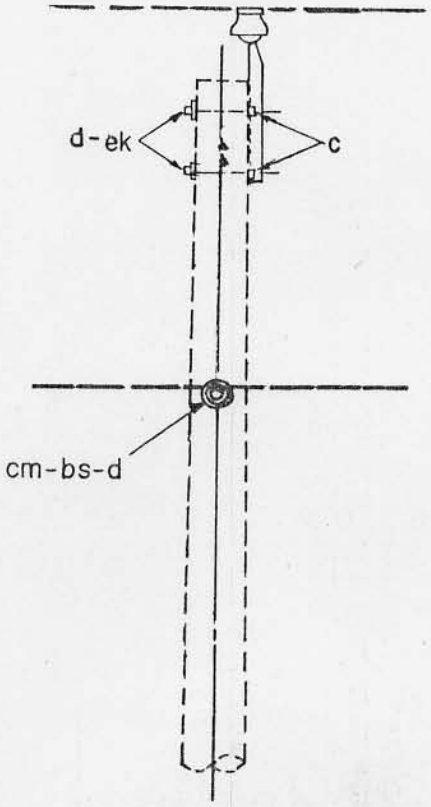
M19	Crossarm drilling guide
M20	Pole framing guide
M21	Angle construction guide, crossarm to vertical construction, 30^{o} to 60^{o} angle
M22-1	Tree trimming guide
M22-2	Tree trimming guide
M24	Cable service assembly guide
M24-1	Open wire service assembly guide
M24-2	Basic minimum clearances
M27	Transformer connection guide, open wire services
M27-1	Transformer connection guide, triplex cable services
M27-2	Transformer connection guide, secondary underbuild
M28	Transformer connection and service take-off guide from secondary

M29-1	Tap assembly guide.
M29-2	Tap assembly guide
M30-1	Guide for installation of ground wire above neutral on guide poles
M30-2	Guide for installation of ground wire above neutral on poles with butt wrapped or driven grounds.
M30-3	Log anchor installation guide
M40-10	Tying guide - single insulator, aluminum alloy or aluminum tie wire, ACSR conductor, aluminum alloy, straight or preforemed armor rods.
M40-11	Armor rods, ACSR conductors
M40-12	Preformed armor rods, ACSR conductors
M40-17	Tying Guide - double insulator, aluminum alloy or aluminum tie wire, ACSR conductor aluminum alloy, straight or preformed armor rods.
M41, M41-1	Bog Shoe Assembly
M41-10	Angle assembly guide, vertical construction, 30° to 60 angle, ACSR conductors with straight or preformed armor rods.
M42-11	Deadend assembly guide, deadend clamp method, ACSR conductors.
M42-13	Deadend assembly guide, large conductors
M43-10	Tap assembly guide, ACSR conductors
M45-21	Splicing guide, compression type, ACSR conductor
M45-22	Splicing guide, compression type, ACSR conductors. 2/0 and larger 1/0 optional
M52-3, M52-4	Neutral identification and pole numbering guide
R1	Clearing right-of-way guide
SL1	Repacom street light installation guide
SL2	Security light installation guide (unmetered)



POLE TOP PIN ASSEMBLY





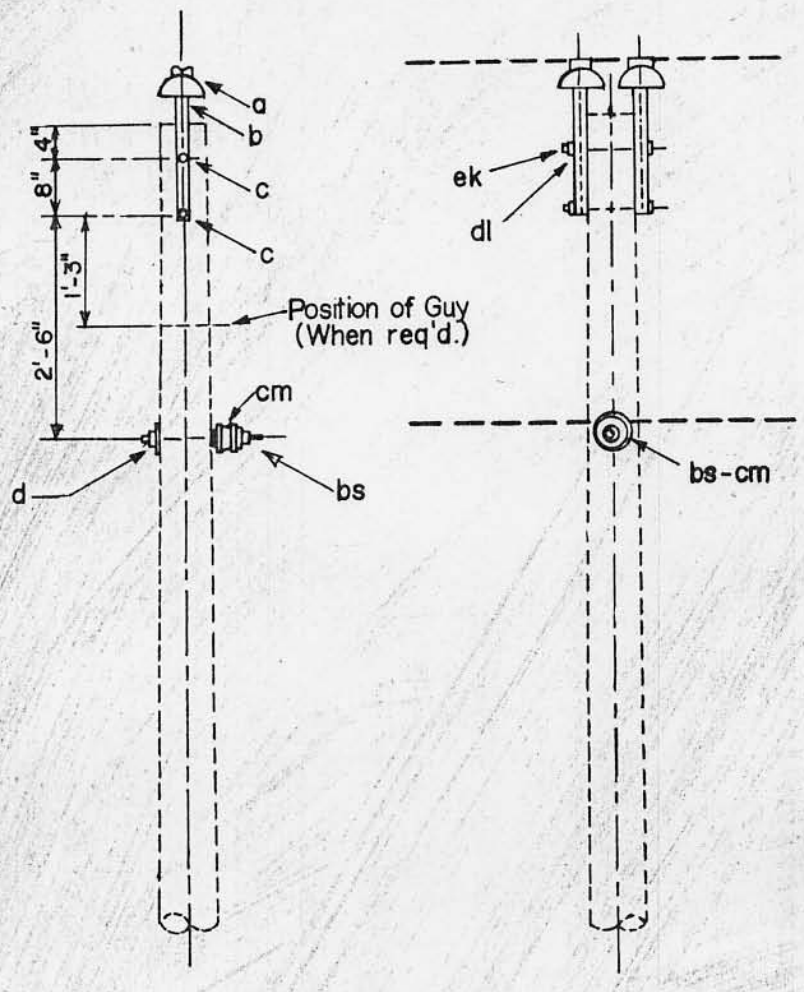
* Conductor Accessories

ITEM	NO.	MATERIAL		ITEM	NO.	MATERIAL	
a	1	Insulator, pin type		ek	2	Locknuts, 5/8"	
b	1	Pin, pole top, 20"		bs	1	Bolt, single upset, 8"	
c	2	Bolt machine, 5/8" x 8"		cm	1	Spool Insulator, 1-3/4" dia. Groove	
d	3	Washer, square, 2 1/4" x 2 1/4" x 3/16", 13/16" hole.					
Av-1	2	Armor Rod (Single Support) *					
Tw	16'	Tie Wire *					

7.62 / 13.2 KV. PRIMARY, SINGLE PHASE
0° TO 5° ANGLE, SINGLE PRIMARY SUPPORT

MAY 15, 1973

A1



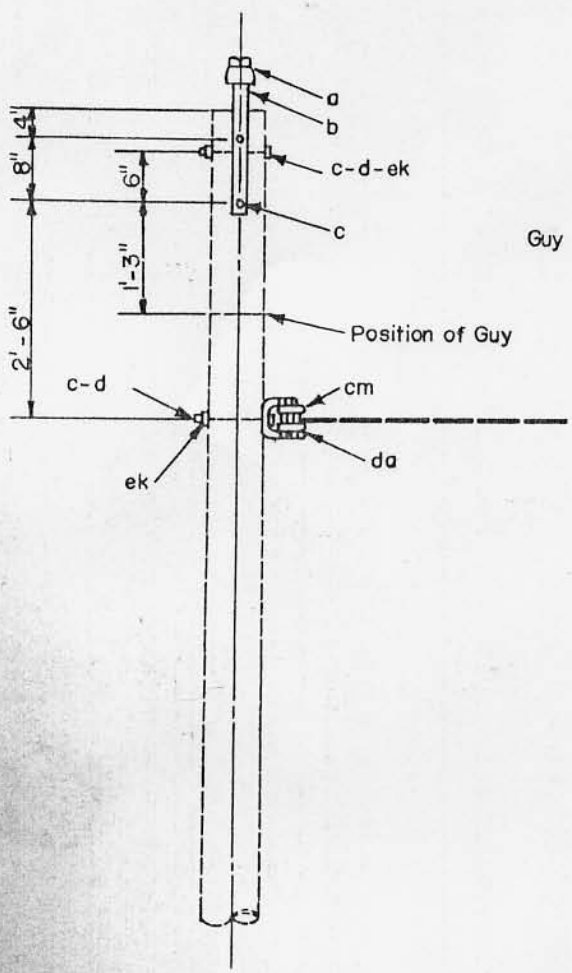
*- Conductor Accessories

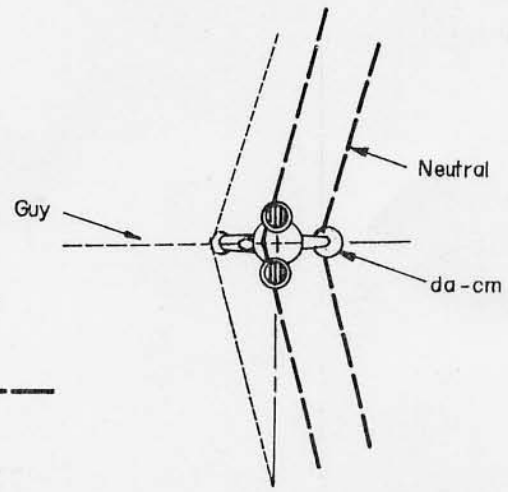
ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
a	2	Insulator, pin type	bs	1	Bolt, single upset, 9"
b	2	Pin, pole top, 20"	cm	1	Spool Insulator, 1 3/4" dia. Groove
c	2	Bolt, machine, 5/8" x 12"	dl	2	Pipe spacer, 3/4" dia. x 1 1/2"
d	1	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16" hole	ek	2	Locknuts, 5/8"
bv-1	1	Armor Rod (Single Support) *			
bv-2	1	Armor Rod (Double Support) *			
Tw	24'	Tie Wire *			

7.62 / 13.2 KV. PRIMARY, SINGLE PHASE,
0° TO 5° ANGLE, DOUBLE PRIMARY SUPPORT.

MAY 15, 1973

A1-1





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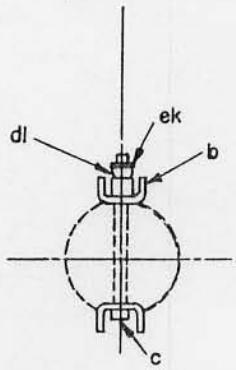


POLE TOP PIN ASSEMBLY

* - Conductor Accessories

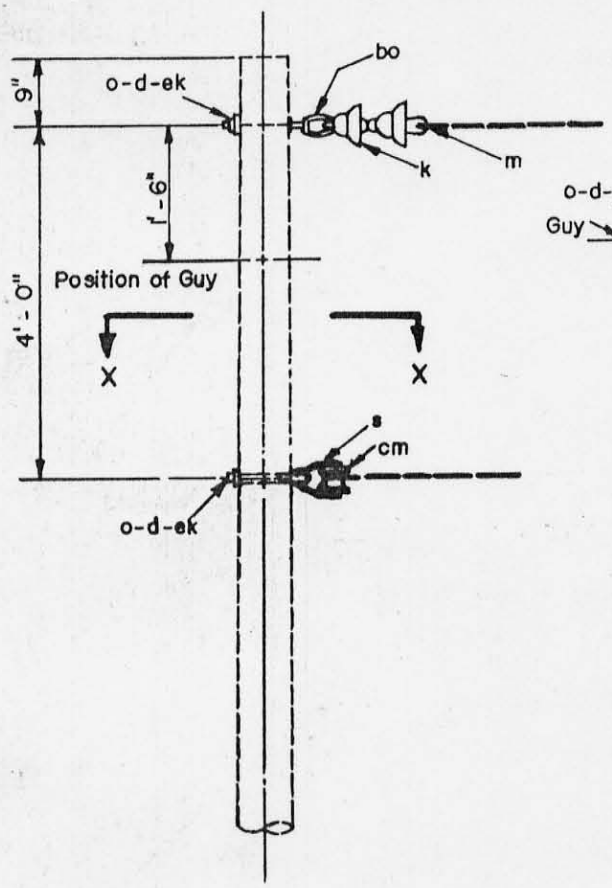
ITEM	NO.	MATERIAL
a	2	Insulator, Pin Type.
b	2	Pin, pole top, 20"
c	2	Bolt, machine, 5/8" x 10"
c	2	Bolt, machine, 5/8" x 12"
d	3	Washer, 2-1/4" x 2-1/4" x3/16", 13/16" hole.
cm	1	Spool Insulator, 1-3/4" dia. Groove
da	1	Bracket

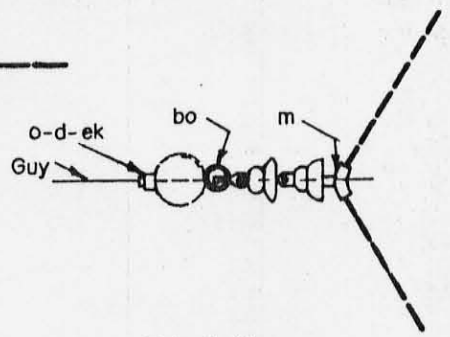
ITEM	NO.	MATERIAL
dl	2	Pipe spacer, 3/4" dia. Groove
ek	4	Locknuts, 5/8"
bv-1	1	Armor Rod (Single Support) *
bv-2	1	Armor Rod (Double Support) *
Tw	24'	Tie Wire *

7.62/13.2 KV. SINGLE PHASE, DOUBLE PRIMARY SUPPORTS, MAXIMUM TRANSVERSE LOADING 500 LBS./PIN (5° TO 30° MAXIMUM ANGLE)

MAY 15, 1973

A2





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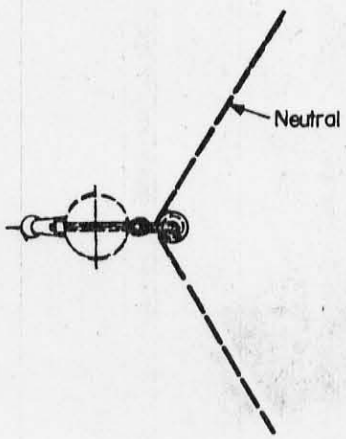


SECTION X-X

ITEM	NO.	MATERIAL		ITEM	NO.	MATERIAL	
d	2	Washer, 2-1/4" x 2-1/4" x 3/16", 13/16" hole.		s	1	Clevis, secondary, swinging	
k	2	Insulator, suspension		cm	1	Spool Insulator, 1-3/4" dia. groove	
o	2	Bolt, eye, 5/8" x 9"		bo	1	Shackle, anchor	
m	1	Suspension Clamp		ek	2	Locknuts, 5/8"	
Tw	8'	Tie Wire *					
bv-1	2	Armor Rod (Single Support) *					

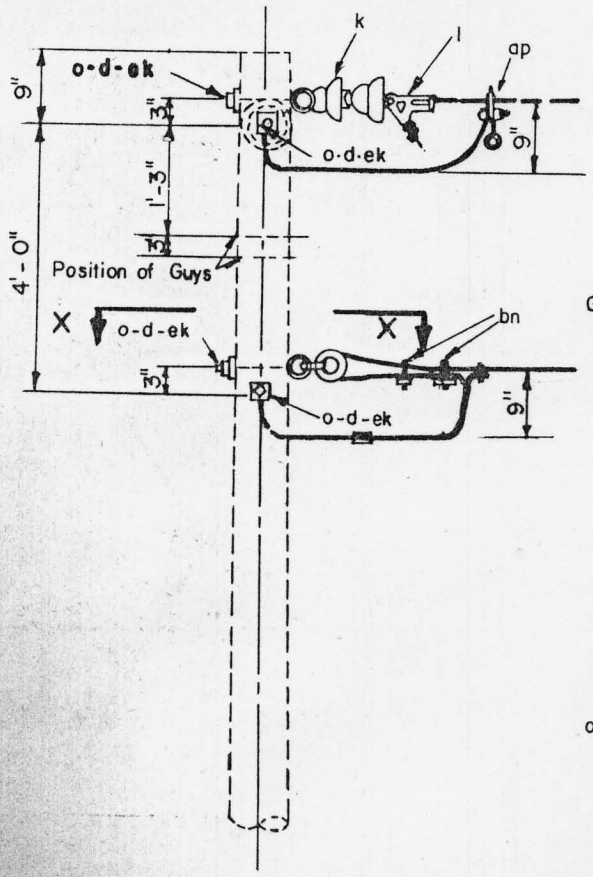
* – Conductor Accessories

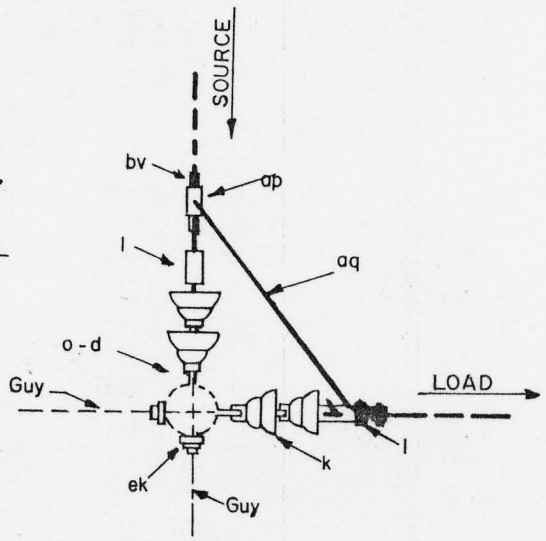
7.62/13.2 KV. PRIMARY, SINGLE PHASE
30° TO 60° ANGLE

MAY 15, 1973

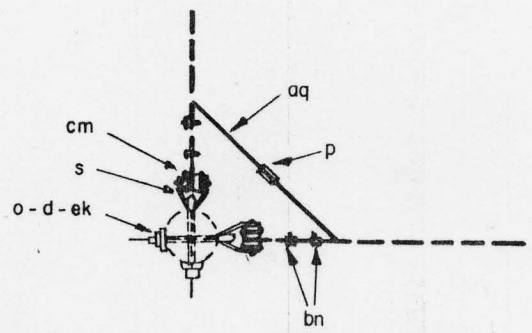
A3

Tap Saddle may be used in lieu of Tapping Armor Rod.





PLAN



SECTION X-X

NOTE:
Install Hotline Clamp on source side.

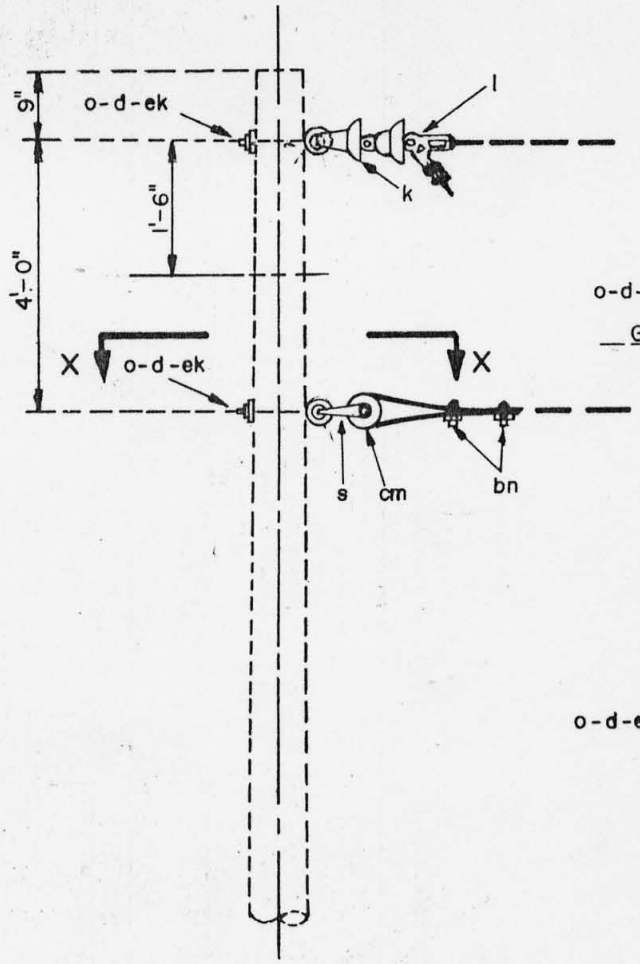
ITEM	NO.	MATERIAL		ITEM	NO.	MATERIAL	
d	4	Washer, 2-1/4" x 2-1/4" x 3/16", 13/16 hole		s	2	Clevis, Secondary, Swinging	
k	4	Insulator, suspension		cm	2	Spool Insulator, 1-3/4" dia. groove	
o	4	Bolt, eye, 5/8" x 9"		bn	4	Clamp, loop deadend	
p	1	Connector, Compression		ek	4	Locknuts, 5/8"	
ap	1	Hot line Clamp		aq		Jumpers, as required	
l	2	Clamp, deadend		T	2'	Armor Tape *	
bv	1	Armor Rod (Tapping) *					

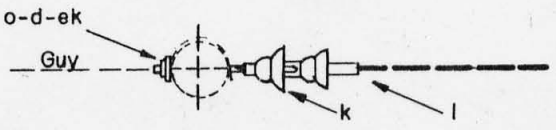
* Conductor Accessories

7.62/13.2 KV. PRIMARY, SINGLE PHASE
60° TO 90° ANGLE

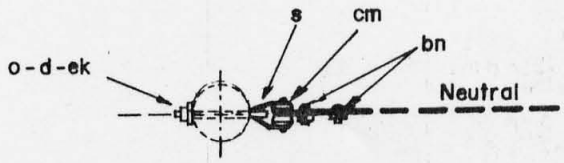
MAY 15, 1973

A4





PLAN



SECTION X-X

ITEM	NO.	MATERIAL		ITEM	NO.	MATERIAL	
d	2	Washer, 2-1/4" x 2-1/4" x 3/16", 13/16 hole.		s	1	Clevis, Sec., swinging.	
k	2	Insulator, Suspension		bn	2	Clamp, loop deadend	
l	1	Clamp, deadend		cm	1	Spool Insulator, 1-3/4" dia. Groove	
o	2	Bolt, eye, 5/8" x 9"		ek	2	Locknuts, 5/8"	
T	1'	Armor Tape *					

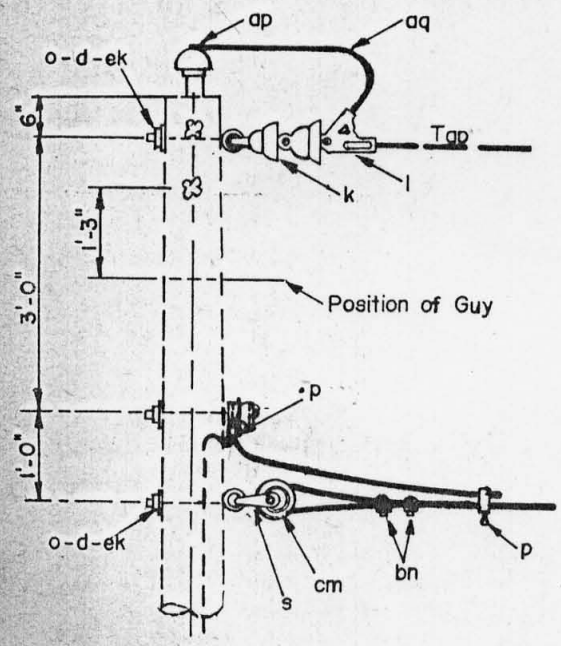
* — Conductor Accessories

7.62/13.2 KV. PRIMARY, 1-PHASE DEADEND (SINGLE)

MAY 15,1973

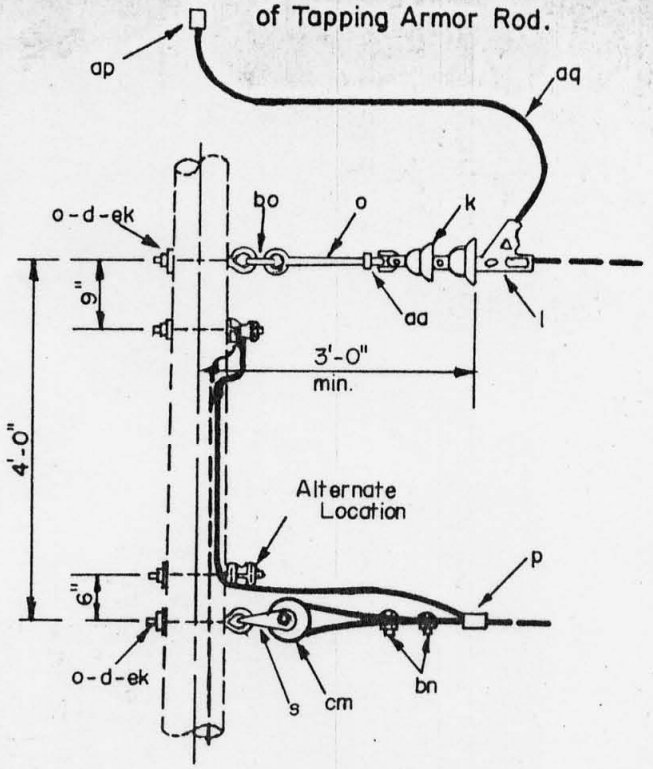
A5

NOTE: See guide drawing M29-1 and M29-2.



A5-1

Top Saddle may be used in lieu of Tapping Armor Rod.



A5-2

NOTES:

A5-1 assembly may be used with drawings such as: A1, A1-1, A2.

NOTES:

A5-2 assembly may be used with drawings such as: B1, B1-1, B2, B7, C1, C1-2, C1-3, C1-4, C2-1, C2-2. (See tap assembly Guide M29-1 and M29-2)

Specify A5-2A for tap to existing eyebolt.

ITEM	NO. REQUIRED A5-1	A5-2	A5-2A	MATERIAL
d	2	2	0	Washer, 2-1/4" x 2-1/4" x 3/16", 13/16" hole
k	2	2	2	Insulator, suspension
o	2-(9")	2-9" 1-18"	1-18"	Bolt, eye, 5/8" x required length
p	2	2	2	Connectors, compression
aa	0	1	3	Nut, eye, 5/8"
aq	as required			Jumpers and Leads
bo	0	1	1	Shackle, anchor
bv	1	1	1	Armor Rod (Tapping) *

ITEM	NO. REQUIRED A5-1	A5-2	A5-2A	MATERIAL
ek	2	2	0	Locknuts, 5/8"
ap	1	1	1	Clamp, hot line
l	1	1	1	Clamp, deadend
s	1	1	1	Clevis, secondary, swinging
cm	1	1	1	Spool Insulator, 1-3/4" dia. groove
bn	2	2	2	Clamp, loop deadend
T	1'	1'	1'	Armor Tapes *

* – Conductor Accessories

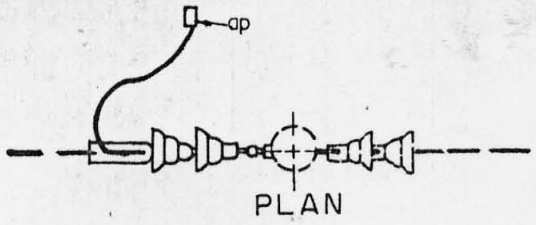
7.62/13.2 KV.

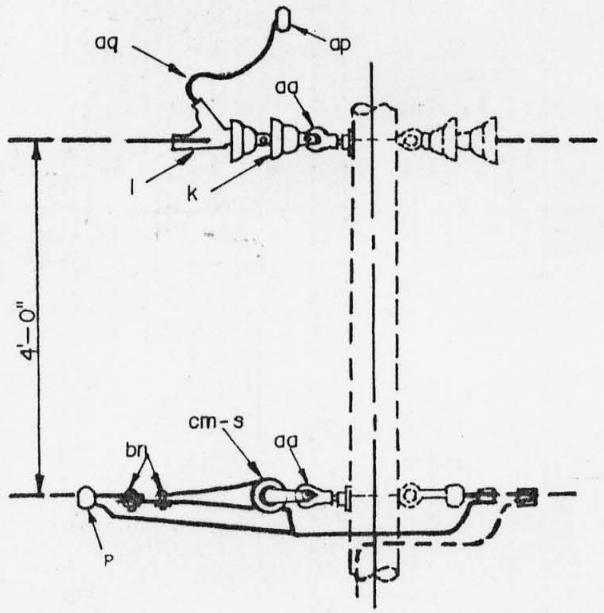
PRIMARY, SINGLE PHASE TAP

MAY 15, 1973

A5-1, A5-2, A5-2A

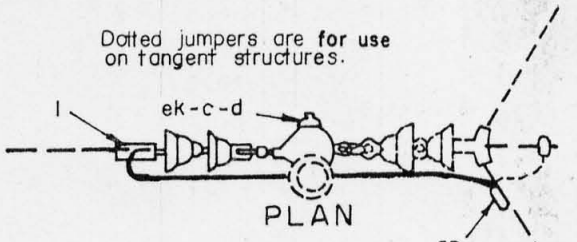
Tap Saddle may be used in lieu of Tapping Armor Rod.

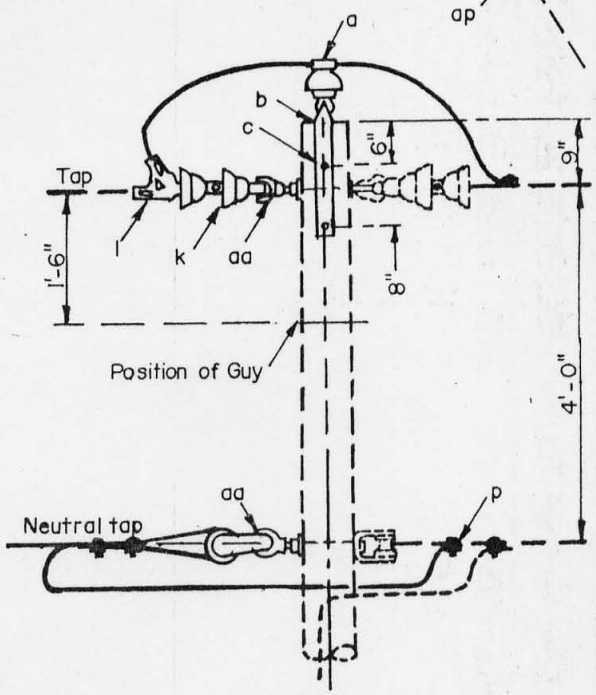




A5-3

Dotted jumpers are for use on tangent structures.





A5-4

NOTE:
This assembly may be used with drawings such as the following: A4, B4, B4-1, C4, C4-1.

See guide drawings M29-1 and M29-2

NOTE:
A5-4 assembly may be used with drawings such as the following: A3, A5, B3, B5, B5-1, C3, C5, C5-1.

ITEM	NO. A5-3	NO. A5-4	MATERIAL
a	0	1	Insulator, pin type
d	0	2	Washer, 2-1/4" x 2-1/4" x 3/16", 13/16" hole.
k	2	2	Insulator, suspension
b	0	1	Pin, pole top, 20"
p	2	2	Connectors, compression
aa	2	2	Nut, eye, 5/8"
aq	as req'd.	as req'd.	Jumpers and leads
T	1'	1'	Armor Tape *
bv	1	1	Armor Rod (Tapping) *

ITEM	NO. A5-3	NO. A5-4	MATERIAL
c		2	Bolt, machine, 5/8" x 9"
ek		2	Locknuts, 5/8"
ap	1	1	Clamp, hot line
l	1	1	Clamp, deadend
cm	1	1	Spool Insulator, 1-3/4" dia. groove
bn	2	2	Clamp, loop deadend
s	1	1	Clevis, secondary, swinging

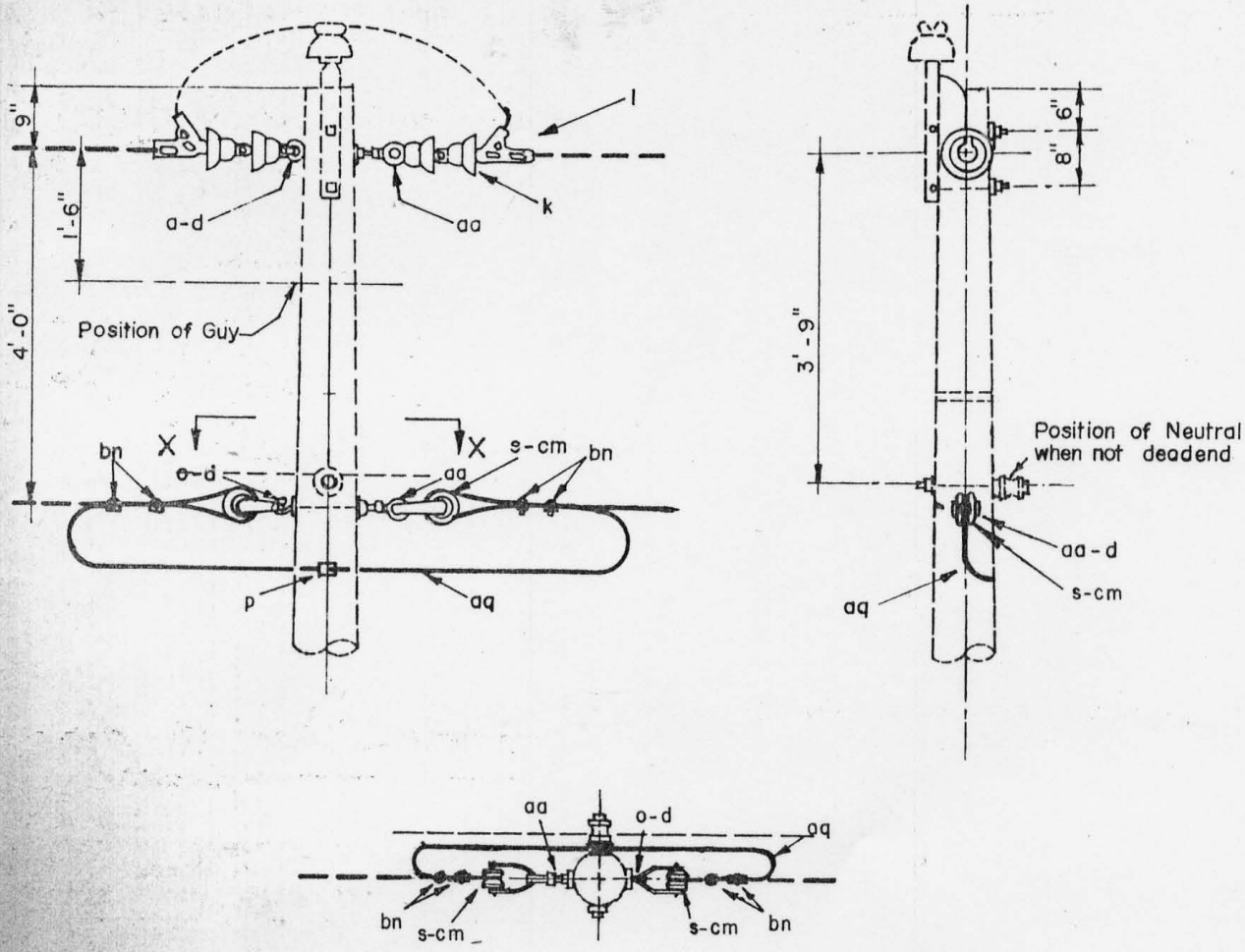
* Conductor Accessories

7.62 / 13.2 KV.

PRIMARY, SINGLE PHASE TAP

MAY 15, 1973

A5-3, A5-4



SECTION X-X

NOTE:

A6 may be used with drawing such as
M3-1, M3-10, M3-41, M3-23,
M5-1, M5-4, M5-2 (as shown)

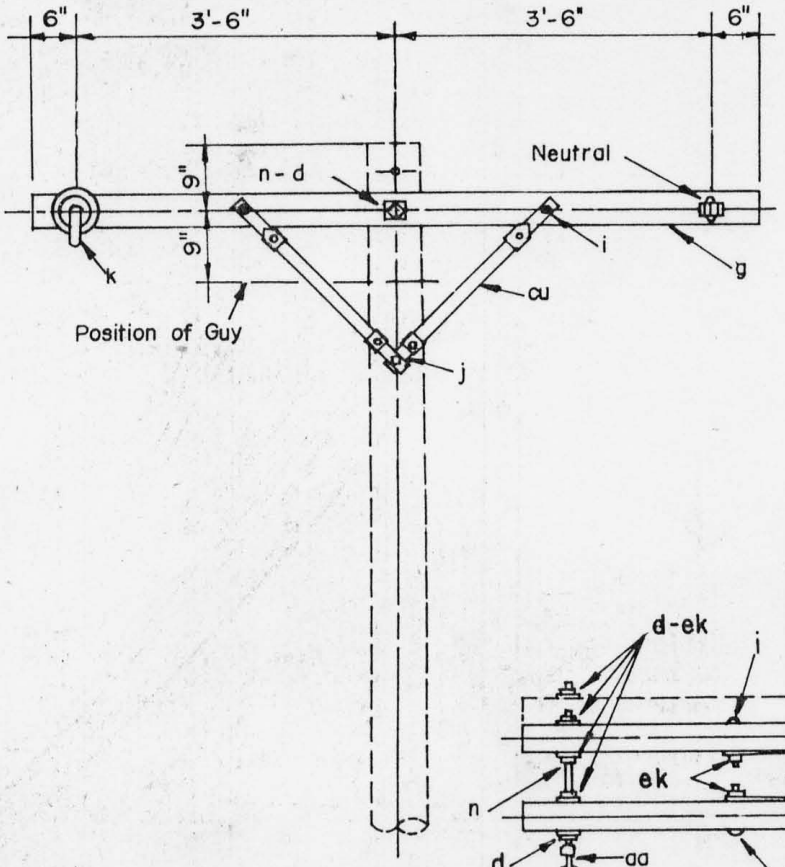
ITEM	NO.	MATERIAL		ITEM	NO.	MATERIAL	
				p	1	Connectors, Compression	
				s	2	Clevis, Sec. swinging	
				aa	2	Nut, eye, 5/8"	
d	4	Washer, 2-1/4" x 2-1/4" x 3/16", 13/16" hole.		aq		Jumpers, as required	
k	4	Insulator, Suspension.		bn	4	Clamp, loop-deadend	
l	2	Clamp, deadend		cm	2	Spool Insulator, 1-3/4" dia. Groove.	
o	2	Bolt, eye, 5/8" x 9"					
T	2'	Armor Tape *					

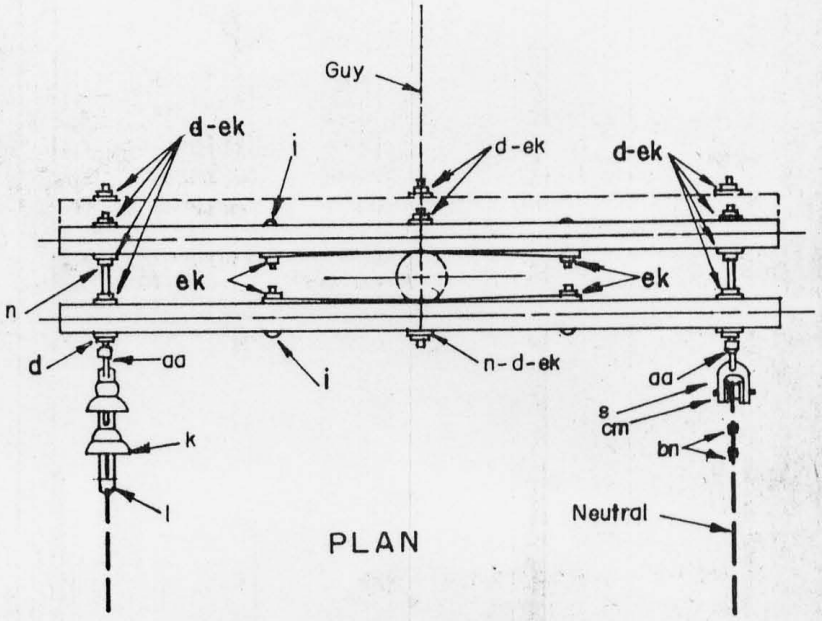
* — Conductor Accessories

7.62/13.2 KV. PRIMARY, SINGLE PHASE VERTICAL DEADEND (DOUBLE)

MAY 15,1973

A6





PLAN

NOTES:

1. SEE DWG. E5-1 FOR CROSSARM LOADING LIMITATIONS.
2. DESIGNATE AS A7-1 WITH THREE CROSSARMS

ITEM	NO.	MATERIAL
d	10	Washer, 2-1/4" x2-1/4" x 3/16", 13/16" hole.
g	2	Crossarm, 3-1/2" x 4-1/2" x 8'-0" (3-A7-1)
i	4	Bolt, carriage, 3/8" x 4-1/2"
j	2	Screw, lag, 1/2" x 4"
k	2	Insulator, suspension
l	1	Clamp, deadend
n	3	Bolt, double arming, 5/8" x 18" (22"/A7-1)
T	1'	Armor Tape *

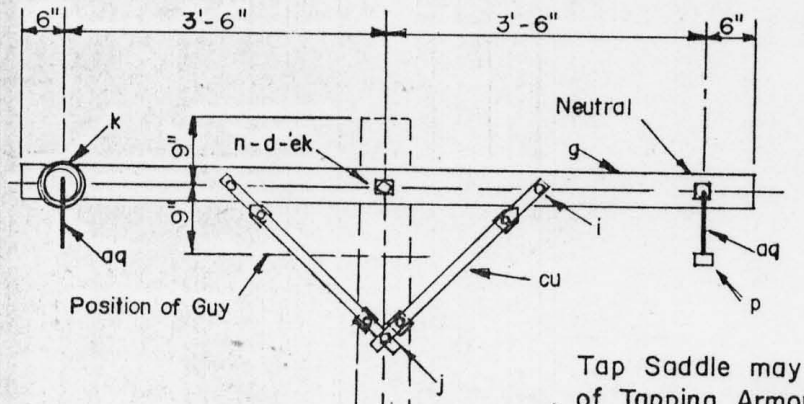
ITEM	NO.	MATERIAL
aa	2	Nut, eye, 5/8"
s	1	Clevis, secondary, swinging
cu	4	Brace, wood, 28"
cm	1	Spool Insulator, 1-3/4" dia. groove
bn	2	Clamp, loop deadend.
ek	8	Locknuts, 5/8"
ek	4	Locknuts, 3/8"

* — Conductor Accessories

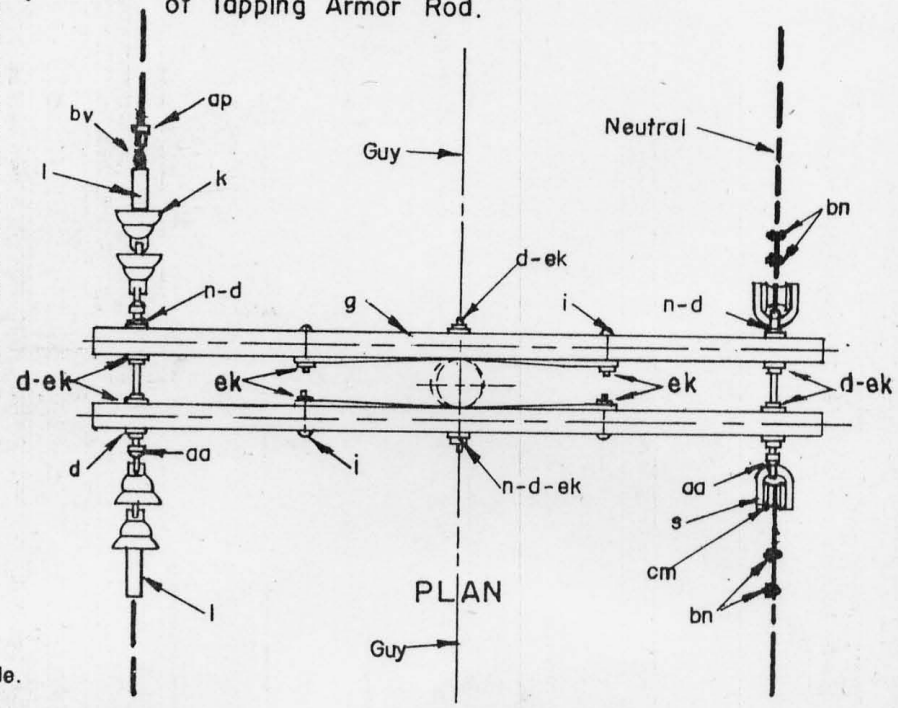
7.62/13.2 KV.
SINGLE PHASE - CROSSARM CONSTRUCTION
DEADEND (SINGLE)

MAY 15, 1973

A7, A7-1



Tap Saddle may be used in lieu of Tapping Armor Rod.



NOTE:

Install Hotline Clamp on Source Side.
Use M5-1 as required.

ITEM	NO.	MATERIAL		ITEM	NO.	MATERIAL	
d	10	Washer, 2-1/4" x 2-1/4" x 3/16", 13/16" hole.		bn	4	Clamp, loop deadend	
g	2	Crossarm, 3-1/2" x 4-1/2" x 8'-0"		p	1	Connectors, compression	
cu	4	Brace, wood, 28"		aa	4	Nut, eye, 5/8"	
i	4	Bolt, carriage, 3/8" x 4-1/2"		aq		Jumpers, as required	
j	2	Screw, lag, 1/2 x 4"		ek	6	Locknuts, 5/8"	
k	4	Insulator, suspension		ek	4	Locknuts, 3/8"	
n	3	Bolt, double arming, 5/8" x 18"		cm	2	Spool Insulator, 1-3/4" dia. groove	
l	2	Clamp, deadend		ap	1	Clamp, hotline	
s	2	Clevis, secondary, swinging		T	2'	Armor Tape *	
bv	1	Armor Rod (Tapping) *					

* – Conductor Accessories

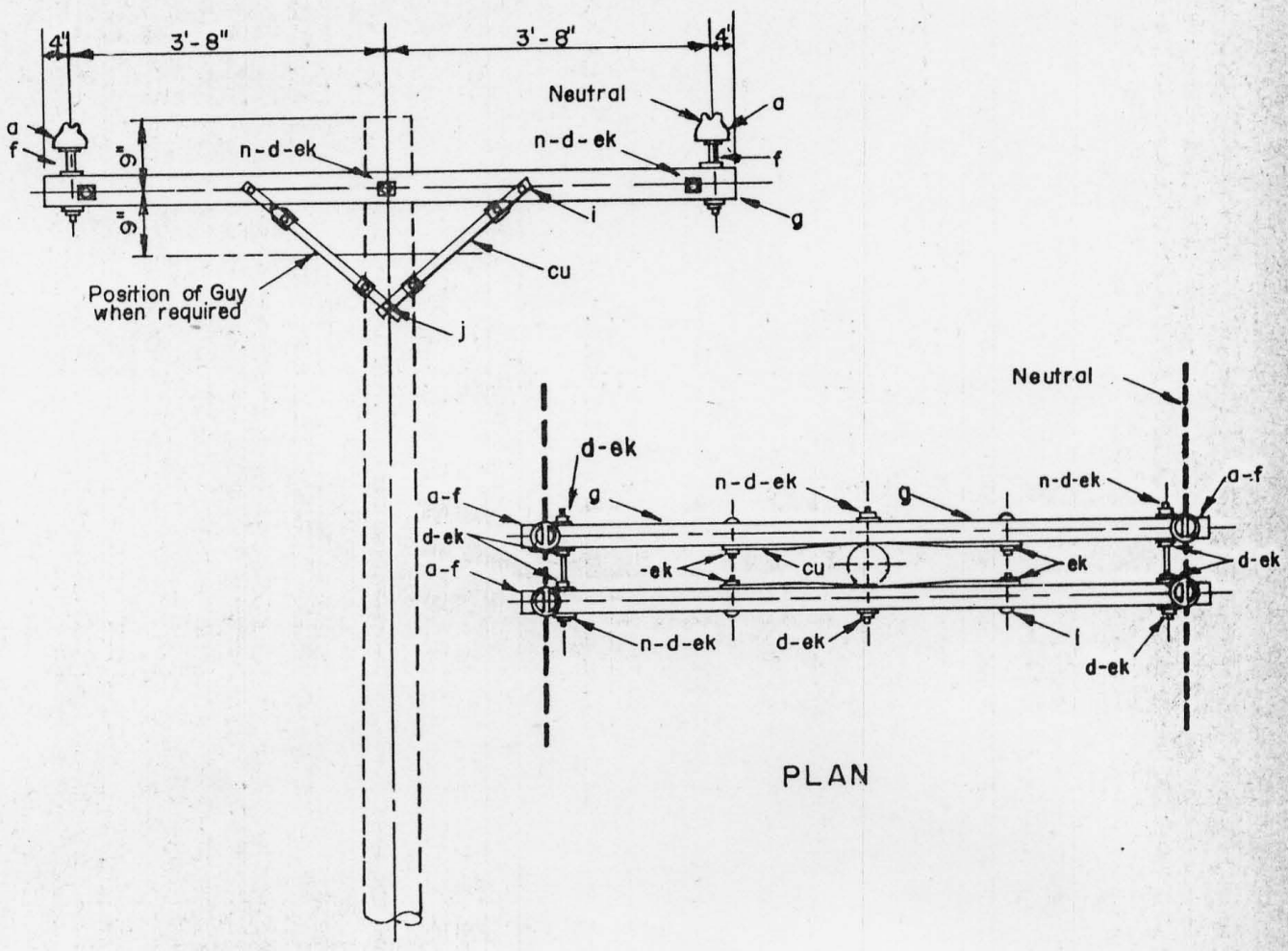
7.62/13.2 KV.

SINGLE PHASE - CROSSARM CONSTRUCTION

DEADEND (DOUBLE)

MAY 15,1973

A8



PLAN

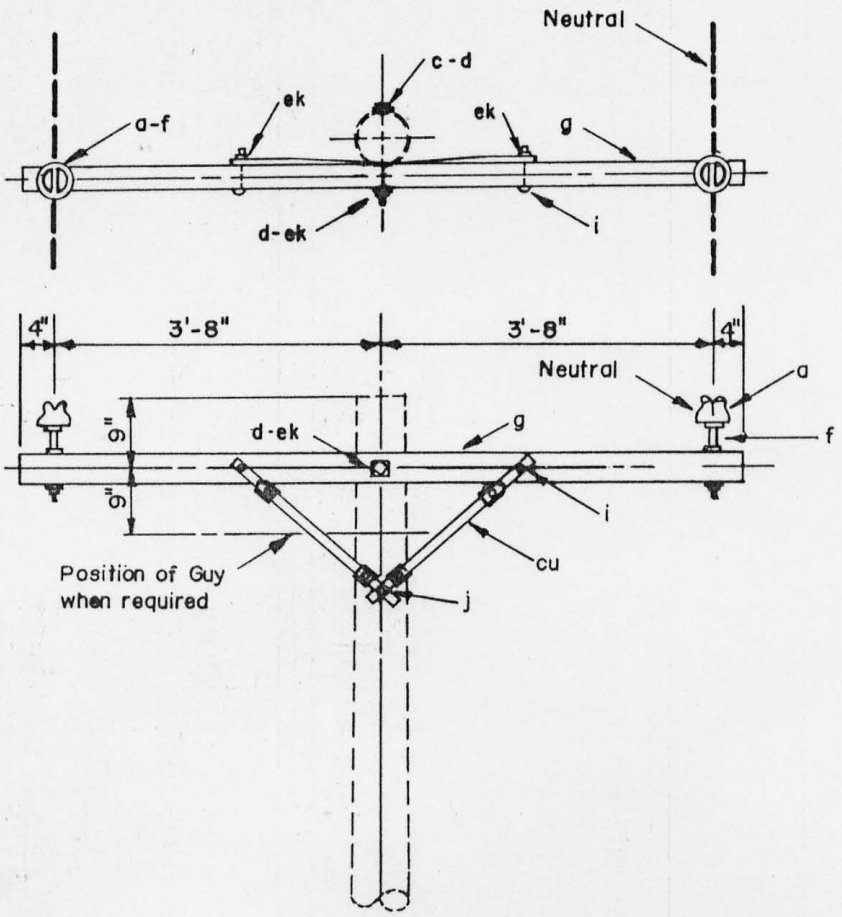
ITEM	NO.	MATERIAL		ITEM	NO.	MATERIAL	
a	4	Insulator, pin type		i	4	Bolt, carriage, 3/8" x 4-1/2"	
d	10	Washer, 2-1/4" x 2-1/4" x 3/16"		j	2	Screw, lag, 1/2" x 4"	
f	4	Pin, crossarm, steel, 5/8" x 10-3/4"		n	3	Bolt, double arming, 5/8" x 18"	
g	2	Crossarm, 3-1/2" x 4-1/2" x 8'-0"		ek	10	Locknuts, 5/8"	
cu	4	Brace, wood, 28"		ek	4	Locknuts, 3/8"	
bv-2	2	Armor Rod (Double Support) *					
Tw	32'	Tie Wire *					

* – Conductor Accessories

7.62/13.2 KV.
SINGLE PHASE – CROSSARM CONSTRUCTION
DOUBLE LINE ARM

MAY 15, 1973

A9



NOTE:

May be used for primary U.B. below a 69 KV. line.

ITEM	NO.	MATERIAL		ITEM	NO.	MATERIAL	
a	2	Insulator, pin type		j	1	Screw, lag, 1/2" x 4"	
c	1	Bolt, machine, 5/8" x 12		cu	2	Brace, wood, 28"	
d	2	Washer, square 2-1/4", x 3/16", 13/16" hole.		ek	1	Locknuts, 5/8"	
f	2	Pin, crossarm, steel, 5/8" x 10-3/4"		ek	2	Locknuts, 3/8"	
g	1	Crossarm, 3-1/2" x 4-1/2" x 8'-0"		bv-1	2	Armor Rod (Single Support)	*
i	2	Bolt, carriage, 3/8" x 4-1/2"		Tw	16'	Tie Wire	*

* - Conductor Accessories

7.62 / 13.2 KV.
SINGLE PHASE - CROSSARM CONSTRUCTION
SINGLE LINE ARM

MAY 15, 1973

A9-1

NOTE: The location of the neutral may be changed in the field as directed by the Engineers.

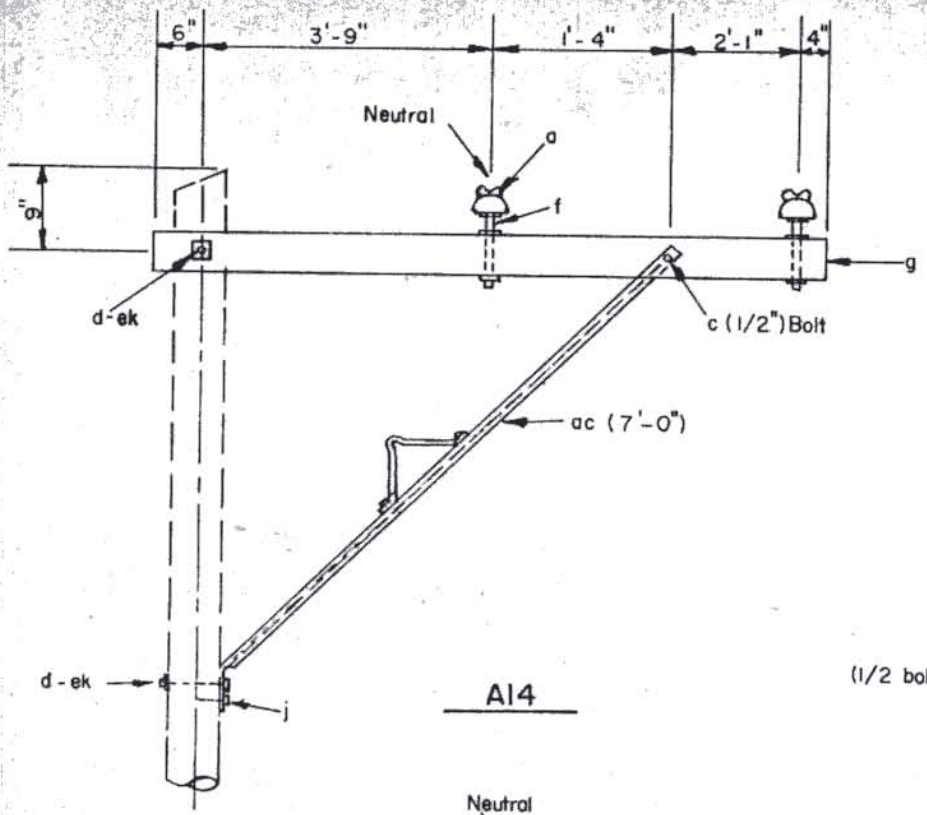
ITEM	NO. REQUIRED		MATERIAL
	A-14	A-15	
a	2	4	Insulator, pin type
c	1	0	Bolt, machine, 5/8" x 12"
c	1	2	Bolt, machine, 1/2" x 6"
c	1	2	Bolt, machine, 1/2" x 10"
d	2	6	Washer, square, 2-1/4" x 2-1/4" x 3/16", 13/16" hole.
d	2	4	Washer, round, 1-3/8" diameter, 9/16" hole.
n	0	2	Bolt, double arming, 5/8" x 18"
f	2	4	Pin, crossarm, steel, 5/8" x 10-3/4"
g	1	2	Crossarm, 3-1/2" x 4-1/2" x 8'-0"
j	1	2	Screw, lag, 1/2" x 4"
ac	1	2	Brace, 84" sidearm, diagonal
ek	2	4	Locknuts, 1/2"
ek	1	6	Locknuts, 5/8"
bv-1	2		Armor Rod (Single Support) *
bv-2		2	Armor Rod (Double Support) *
Tw	16'	32'	Tie Wire *

* Conductor Accessories

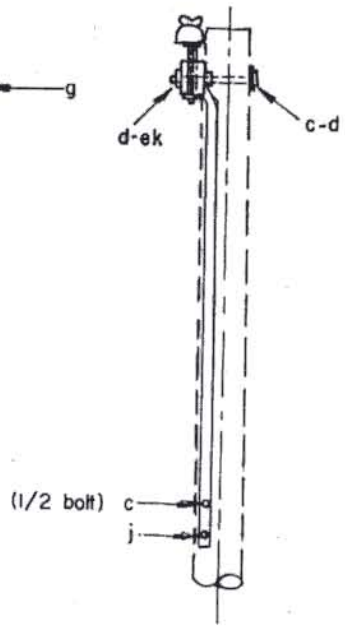
7.62 / 13.2 KV.
PRIMARY, SINGLE PHASE SIDEARM
TANGENT

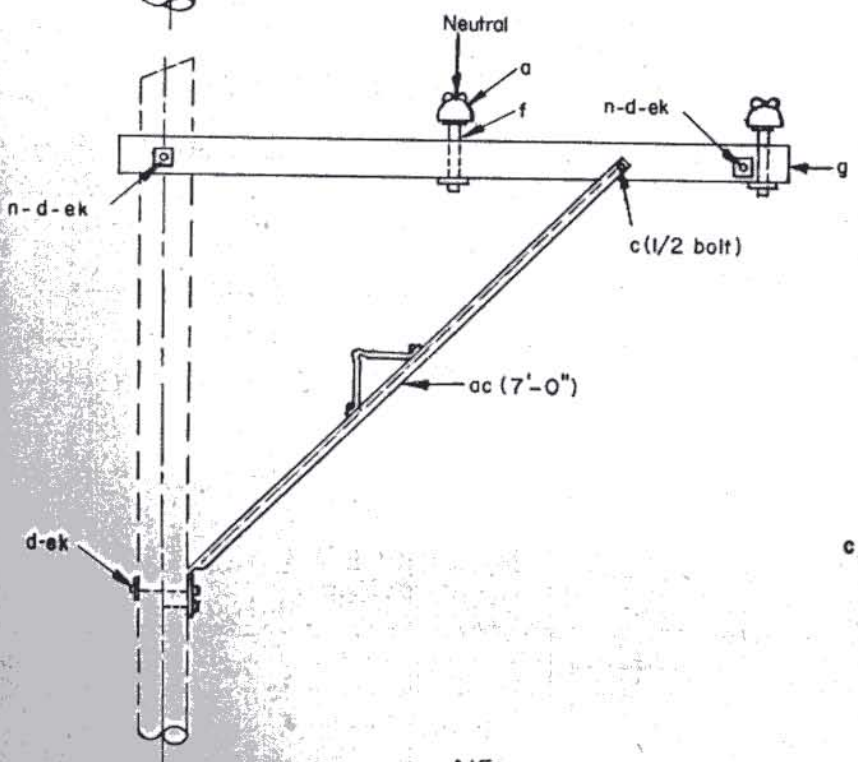
MAY 15, 1973

A14, A15

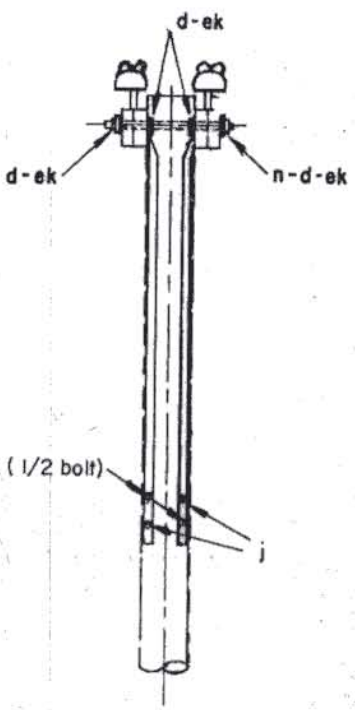


A14

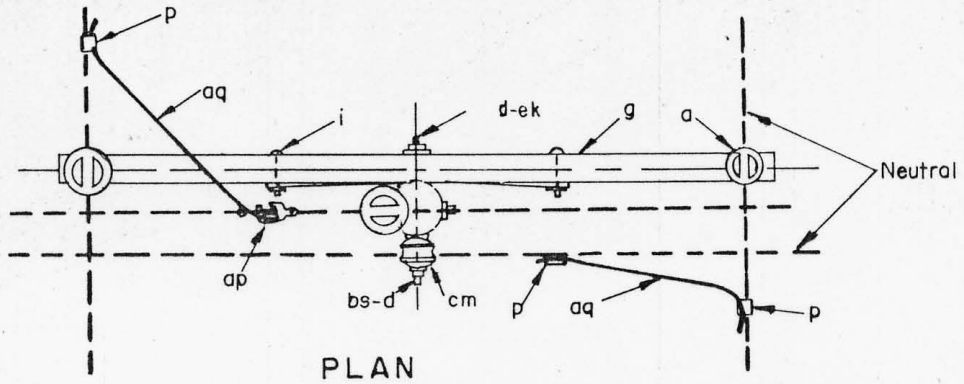




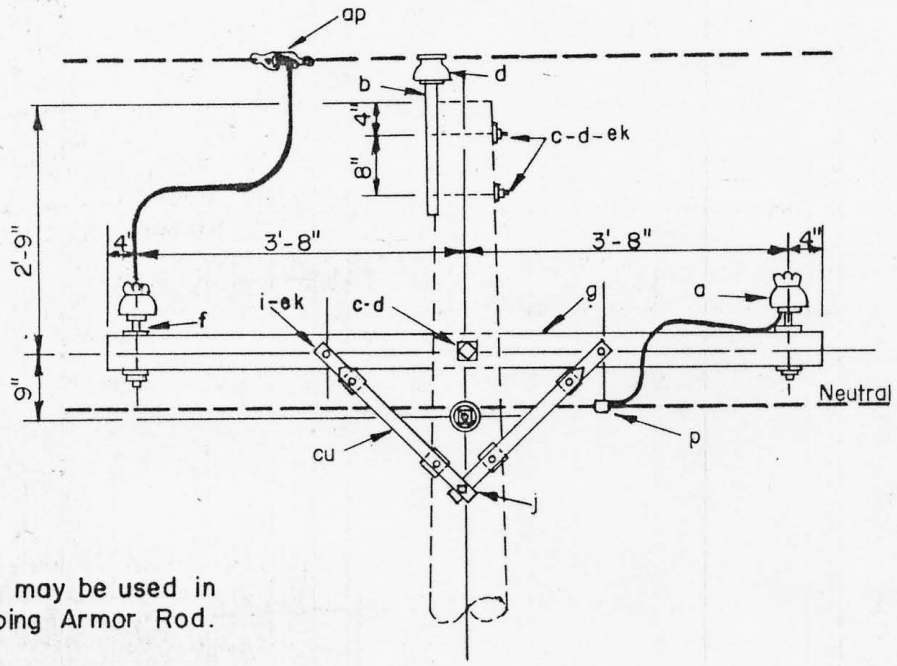
A15



NOTE: See material list on following drawing.



PLAN



Note:

Tap Saddle may be used in lieu of Tapping Armor Rod.

ELEVATION

ITEM	NO.	MATERIAL		ITEM	NO.	MATERIAL	
a	3	Insulator, pin type		ap	1	Clamp, hotline	
b	1	Pin, pole top, 20"		i	2	Bolt, carriage, 3/8" x 4-1/2"	
c	2	Bolt, machine, 5/8" x 10"		j	1	Screw, lag, 1/2" x 4"	
c	1	Bolt, machine, 5/8" x 14"		p	3	Connectors, compression	
d	5	Washer, 2-1/4" x 2-1/4" x 3/16", 13/16" hole.		aq		Jumper and Leads, as required	
f	2	Pin, crossarm, steel, 5/8" x 10-3/4"		bs	1	Bolt, single upset, 10"	
g	1	Crossarm, 3-1/2" x 4-1/2" x 8'-0"		ek	3	Locknuts, 5/8"	
cu	2	Brace, wood, 28"		ek	2	Locknuts, 3/8"	
bv-1	4	Armor Rod (Single Support) *					
Tw	32'	Tie Wire *					
cm	1	Spool Insulator, 1-3/4" dia. groove					
bv	1	Armor Rod (Tapping) *					

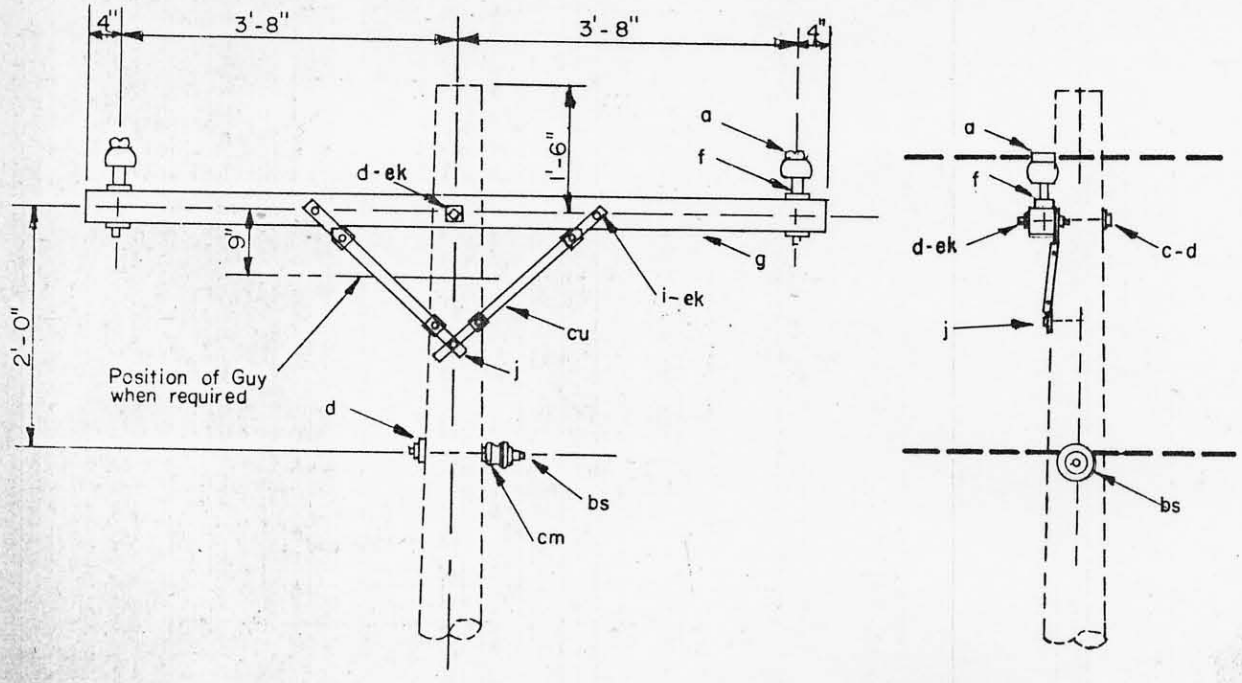
* Conductor Accessories

7.62/13.2 KV.

1-PHASE CROSSARM CONSTRUCTION – SINGLE PHASE

JUNCTION AT 0° TO 5°

A22



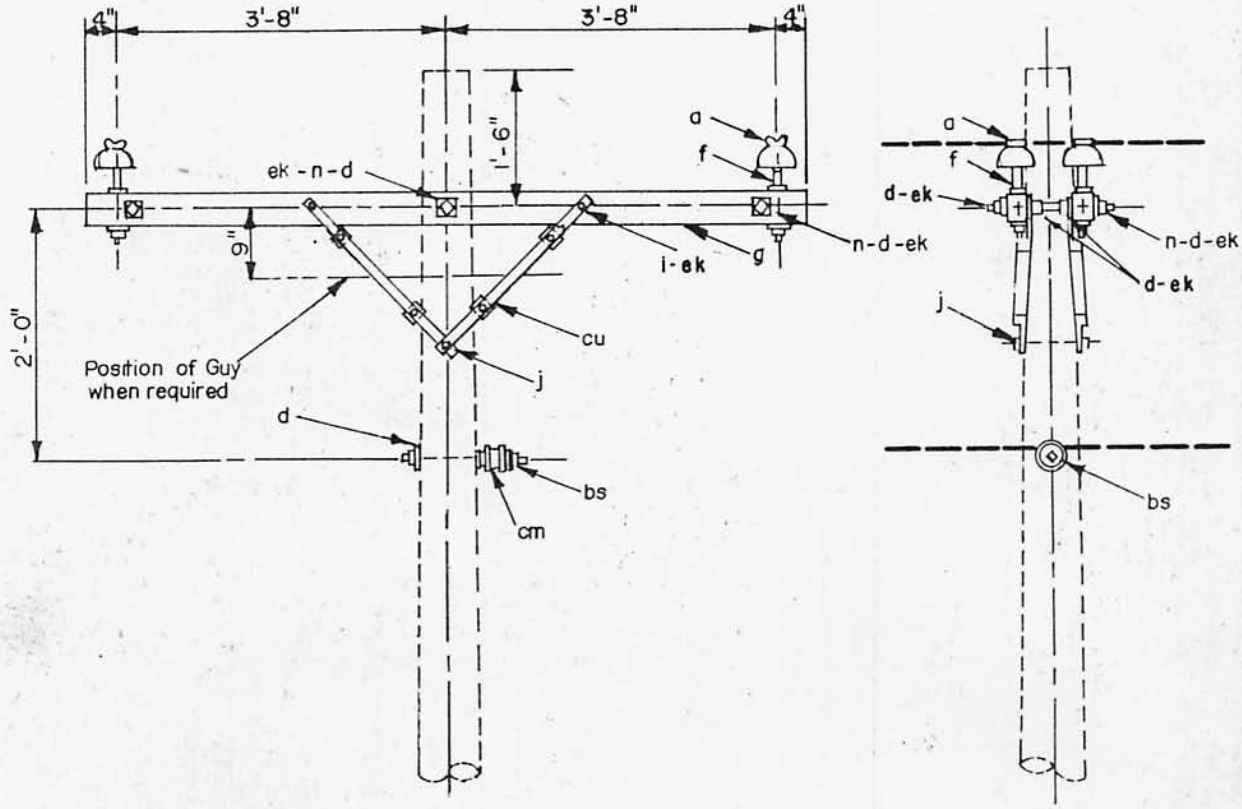
ITEM	NO.	MATERIAL		ITEM	NO.	MATERIAL	
a	2	Insulator, pin type		ek	2	Locknuts, 3/8"	
c	1	Bolt, machine, 5/8" x 14"		ek	1	Locknut, 5/8"	
d	3	Washer, 2-1/4" x 2-1/4" x 3/16", 13/16" hole.		i	2	Bolt, Carriage, 3/8" x 4-1/2"	
f	2	Pin, crossarm, steel, 5/8" x 10-3/4"		bs	1	Bolt, Single Upset, 10"	
g	1	Crossarm, 3-1/2" x 4-1/2" x 8'-0"		j	1	Screw, lag, 1/2" x 4"	
cu	2	Brace Wood, 28"		cm	1	Spool Insulator, 1-3/4" dia. Groove	
bv-1	3	Armor Rod (Single Support) *					
Tw	24'	Tie Wire *					

* – Conductor Accessories

7.62 / 13.2 KV., TWO PHASE, CROSSARM CONSTR.- 0° TO 5° ANGLE SINGLE PRIMARY SUPPORT

MAY 15,1973

B1



ITEM	NO.	MATERIAL		ITEM	NO.	MATERIAL	
a	4	Insulator, pin type		ek	10	Locknuts, 5/8"	
d	11	Washer, 2-1/4" x 2-1/4" x 3/16", 13/16" hole		i	4	Bolt, carriage, 3/8" x 4-1/2"	
f	4	Pin, crossarm, steel, 5/8" x 10-3/4"		j	2	Screw, lag, 1/2" x 4"	
g	2	Crossarm, 3-1/2" x 4-1/2 x 8'-0"		n	3	Bolt, double arming, 5/8" x 20"	
cu	4	Brace, wood, 28"		bs	1	Bolt, single upset, 10"	
ek	4	Locknuts, 3/8"		cm	1	Spool Insulator, 1-3/4" dia. groove	
bv-1	1	Armor Rod (Single Support) *					
bv-2	2	Armor Rod (Double Support) *					
TW	40'	Tie Wires *					

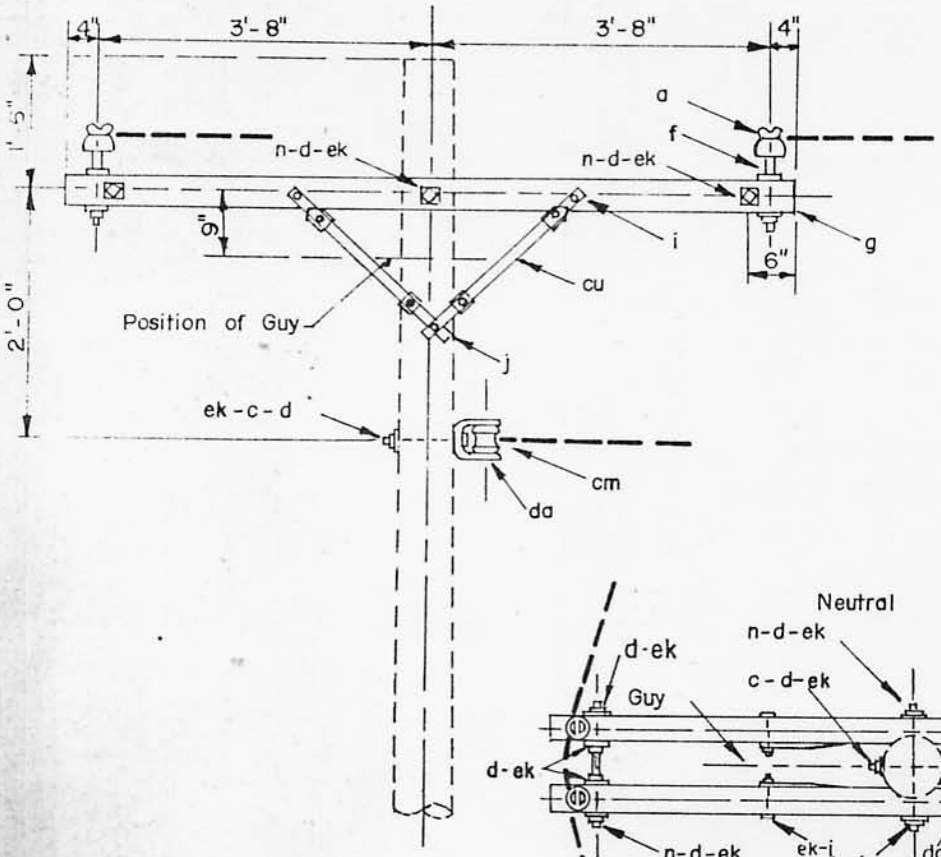
* - Conductor Accessories

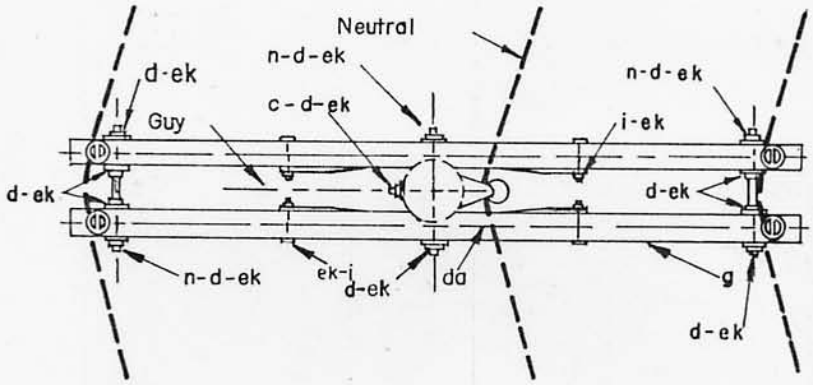
7.62 / 13.2 KV.

TWO-PHASE, CROSSARM CONSTRUCTION, DOUBLE - PRIMARY SUPPORT AT 0° TO 5° ANGLE

MAY 15, 1973

B1-1





PLAN

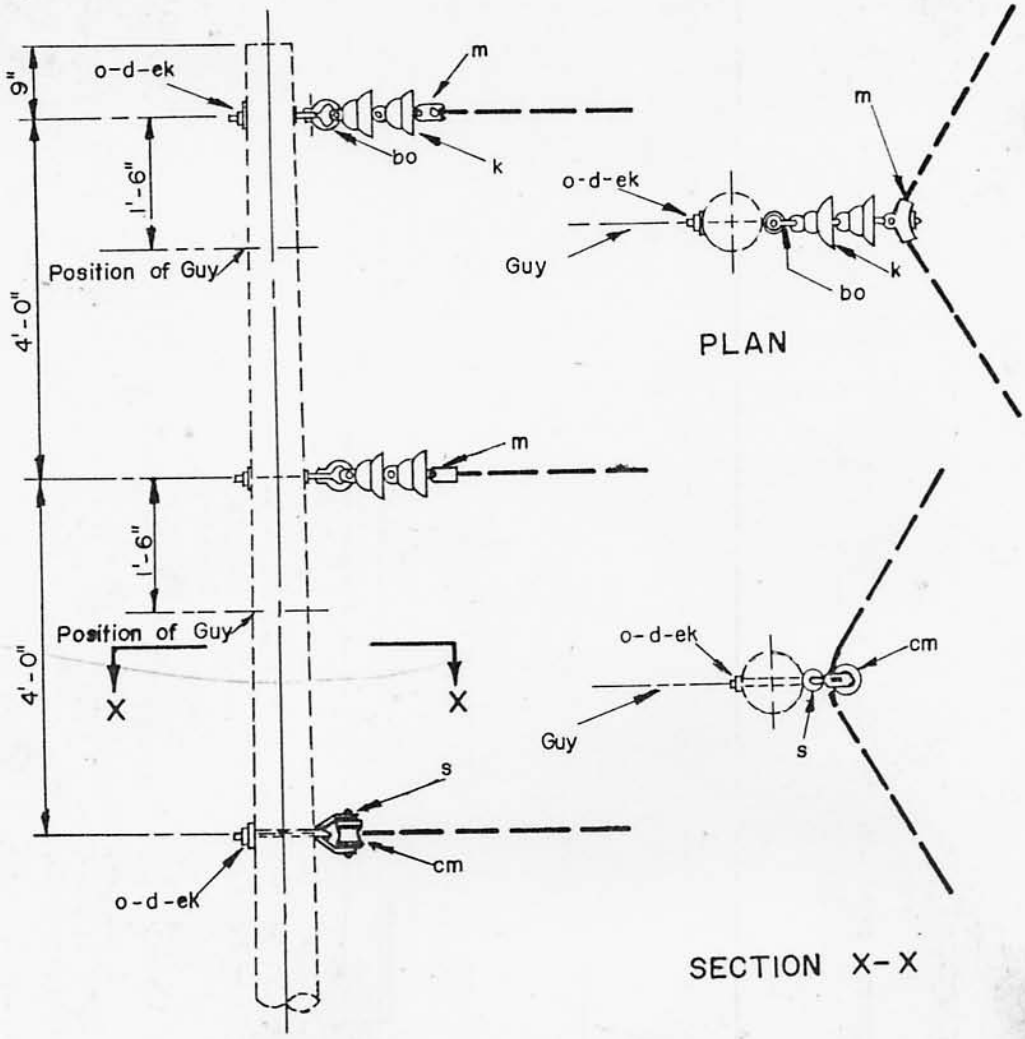
ITEM	NO.	MATERIAL		ITEM	NO.	MATERIAL	
a	4	Insulator, pin type		j	2	Screw, lag, 1/2" x 4"	
c	1	Bolt, machine, 5/8" x 10"		i	4	Bolt, carriage, 3/8" x 4-1/2"	
d		Washer, 2-1/4" x 2-1/4" x 3/16", 13/16" hole		n	3	Bolt, double arming, 5/8" x 20"	
f	4	Pin, crossarm, steel, 5/8" x 10-3/4"		da	1	Bracket	
g	2	Crossarm, 3-1/2" x 4-1/2" x 8'-0"		ek	11	Locknuts, 5/8"	
cu	4	Brace Wood, 28"		cm	1	Spool Insulator, 1-3/4" dia. Groove	
ek	4	Locknuts, 3/8"		bv-1	1	Armor Rod (Single Support)	
bv-1	2	Armor Rod (Double Support) *					
tw	40'	Tie Wire *					

* - Conductor Accessories

7.62 / 13.2 KV. - TWO PHASE, CROSSARM CONSTRUCTION - DOUBLE PRIMARY SUPPORTS, MAX. TRANSVERSE LOADING-500 LBS./PIN 5° TO 30° MAX ANGLE

MAY 15, 1973

B2



NOTE: Neutral may be lowered to C3 position if future conversion is likely. Designate as B3A for this construction.

ITEM	NO.	MATERIAL		ITEM	NO.	MATERIAL	
d	3	Washer, 2-1/4" x 2-1/4" x 3/16", 13/16" hole		s	1	Clevis, secondary, swinging	
k	4	Insulator, Suspension		cm	1	Spool Insulator, 1-3/4" dia. groove **	
o	3	Bolt, eye, 5/8" x 10"		bo	2	Shackle, anchor	
m	2	Clamp, suspension		ek	3	Locknuts, 5/8"	
bv-1	3	Armor Rod (Single Support) *					
Tw	8'	Tie Wire *					

* - Conductor Accessories

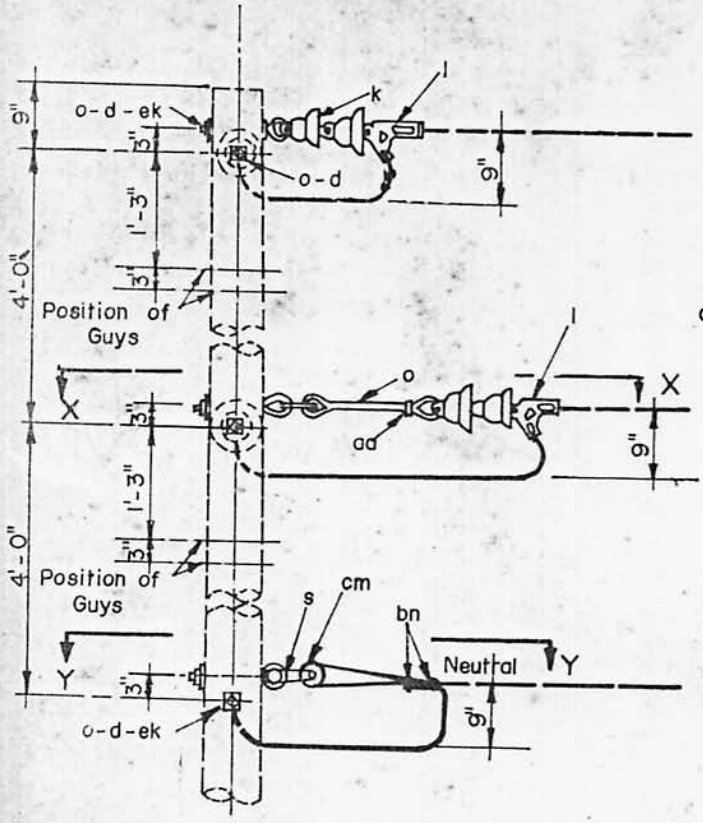
** See M 42-11

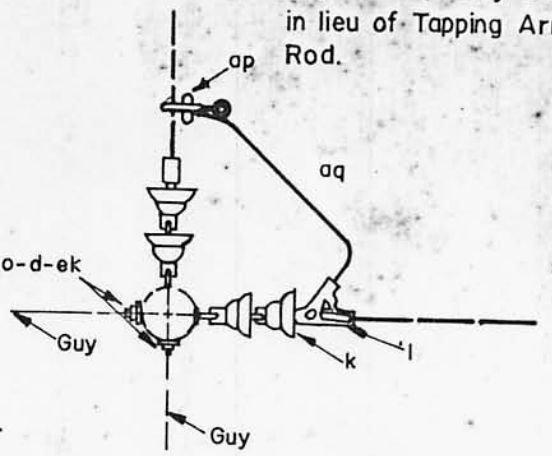
7.62 / 13.2 KV.- TWO PHASE VERTICAL CONSTRUCTION- 30° TO 60° ANGLE

MAY 15, 1973

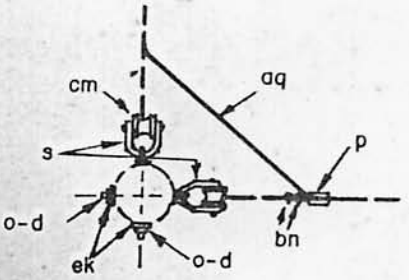
B3, B3A

Tap Saddle may be used in lieu of Tapping Armor Rod.

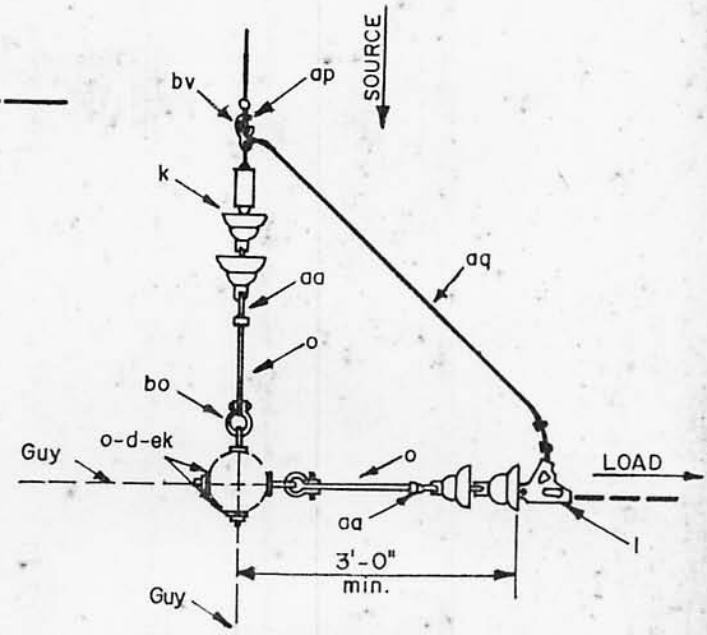




PLAN



SECTION Y—Y



SECTION X-X

NOTE

Neutral may be lowered to C4-1, position if future conversion is likely.
Designate as B4-1A for this construction

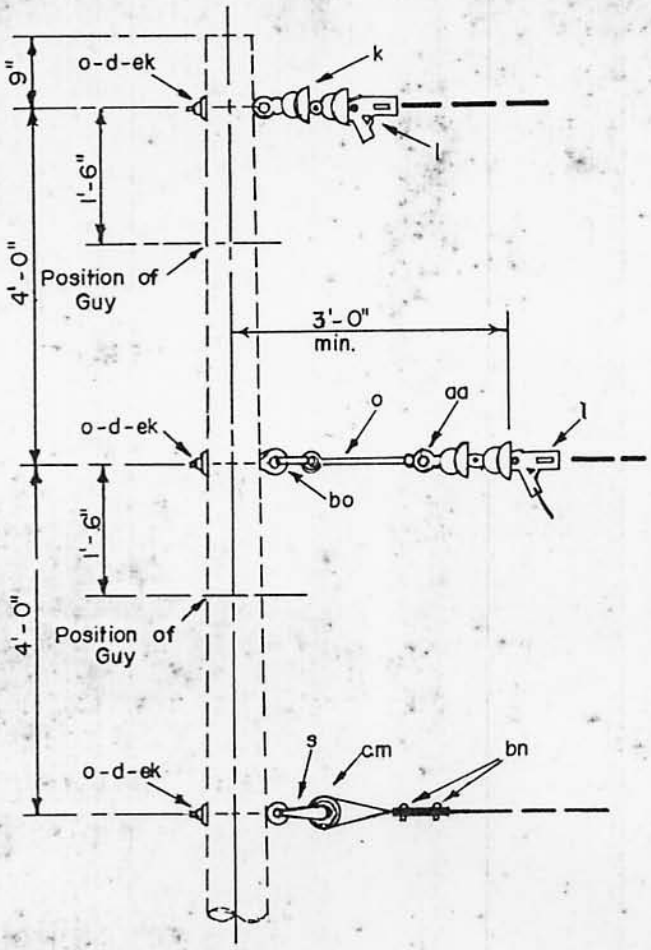
ITEM	NO.	MATERIAL		ITEM	NO.	MATERIAL	
d	6	Washer, 2-1/4" x 2-1/4" x 3/16", 13/16" hole.		s	2	Clevis, secondary, swinging	
k	8	Insulator, suspension		cm	2	Spool Insulator, 1-3/4" dia. groove	**
o	6	Bolt, eye, 5/8" x 10"		bn	4	Clamp, loop, deadend	
p	2	Connectors, compression		bo	2	Shackle, anchor	
aa	2	Nut, eye, 5/8"		ek	6	Locknuts, 5/8"	
aq		Leads and Jumpers, as required.		ap	2	Hotline Clamp	
o	2	Bolt, eye, 5/8" x 18"		l	4	Clamp, deadend	
bv	2	Armor Rod (Topping)	*				
T	2'	Armor tape	*				

* - Conductor Accessories
** - See M42-11

7.62/13.2 KV.
TWO PHASE, VERTICAL CONSTRUCTION, 60° TO 90° ANGLE

MAY 15, 1973

B4-1 B4-1A



NOTE

Neutral may be lowered to C5-1 position if future conversion is likely

Designate as B5-1A for this construction

ITEM	NO.	MATERIAL		ITEM	NO.	MATERIAL	
d	3	Washer, 2-1/4" x 2-1/4" x 3/16", 13/16" hole.		cm	1	Spool Insulator, 1-3/4" dia. groove **	
k	4	Insulator, suspension		bn	2	Clamp, loop deadend	
o	3	Bolt, eye, 5/8" x 10"		l	2	Clamp, deadend	
aa	1	Nut, eye, 5/8"		bo	1	Shackle, anchor	
o	1	Bolt, eye, 5/8" x 18"		ek	3	Locknuts, 5/8"	
s	1	Clevis, secondary, swinging		T	1'	Armor Tape *	

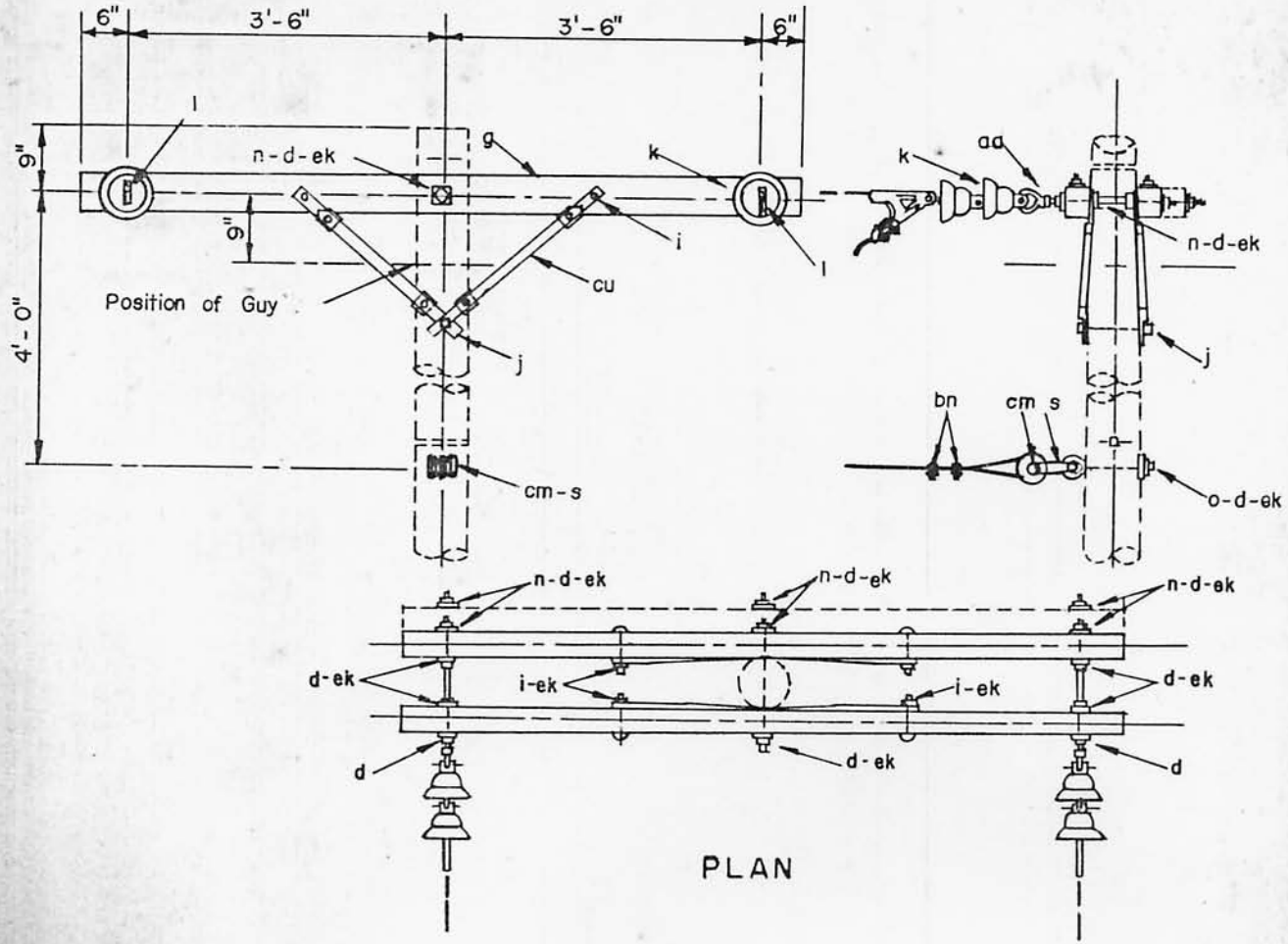
* - Conductor Accessories

** - See M42-11

7.62/13.2 KV., TWO-PHASE, VERTICAL CONSTRUCTION - DEADEND (SINGLE)

MAY 15, 1973

B5-1, B5-1A



NOTES:

1. Designate as B7-1 for assembly with three crossarms. ("2 ACSR & Larger)
2. See drawing E5-1 for crossarm loading limitations.

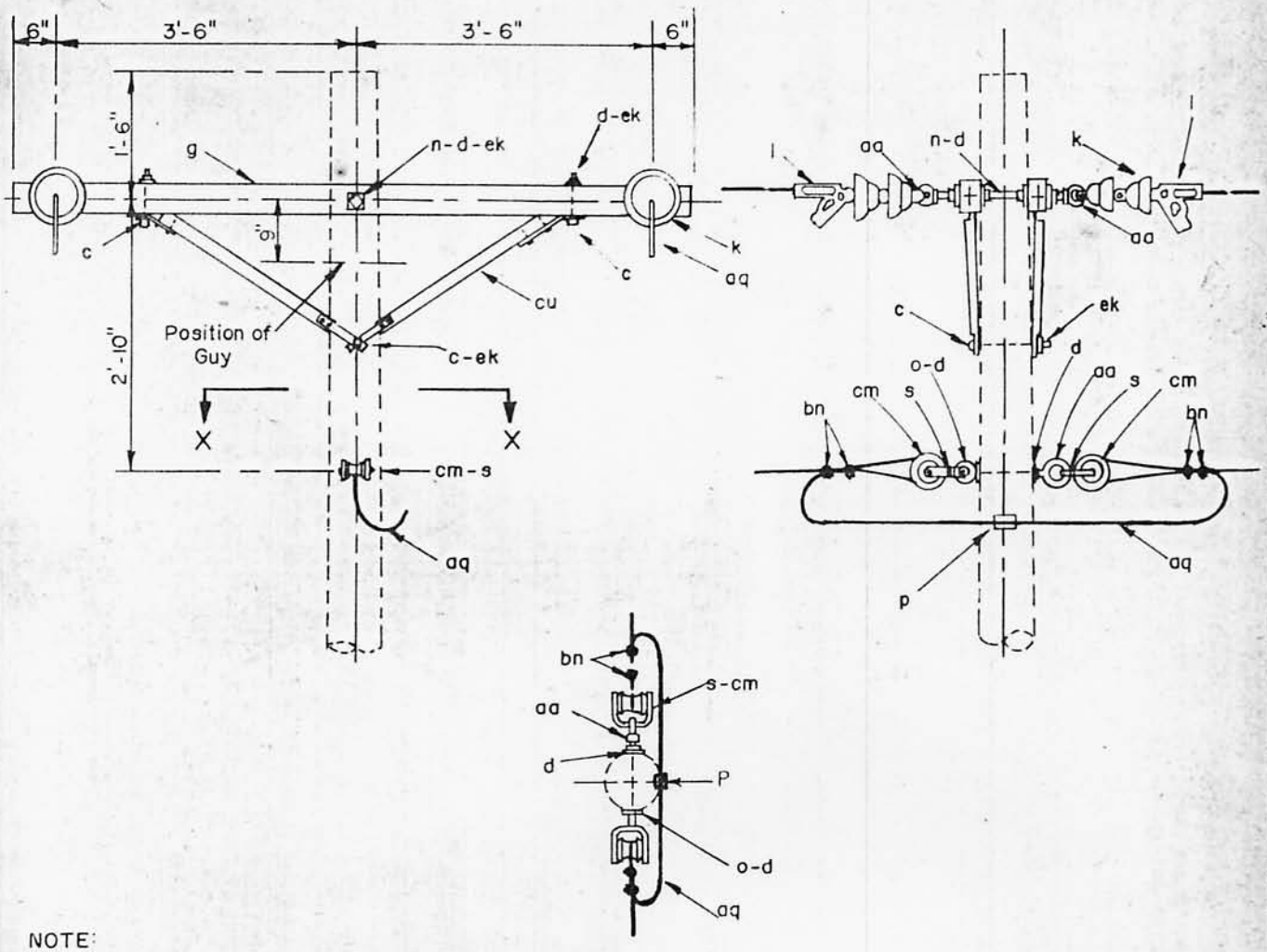
ITEM	NO.	MATERIAL		ITEM	NO.	MATERIAL	
d	11	Washer, 2-1/4" x 2-1/4" x 3/16", 13/16"hole.		bn	2	Clamp, loop, deadend	
g	2	Crossarm, 3-1/2" x4-1/2" x 8'-0"(B7 only)	(3-B7-1)	j	2	Screw, lag, 1/2" x 4"	
cu	4	Brace Wood, 28"		n	3	Bolt, double arming, 5/8" x 20" (B7 only)	(24"B7-1)
k	4	Insulator, suspension		o	1	Bolt, eye, 5/8" x 10"	
i	4	Bolt, carriage, 3/8" x 4-1/2"		aa	2	Nut, eye, 5/8"	
s	1	Clevis, secondary, swinging		l	2	Clamp, deadend	
cm	1	Spool Insulator, 1-3/4" dia. groove		ek	9	Locknuts, 5/8"	
ek	4	Locknuts, 3/8"					
T	1'	Armor Tape *					

* — Conductor Accessories

7.62/13.2 KV., TWO PHASE
CROSSARM CONSTRUCTION - DEADEND (SINGLE)

MAY 15, 1973

B7, B7-1



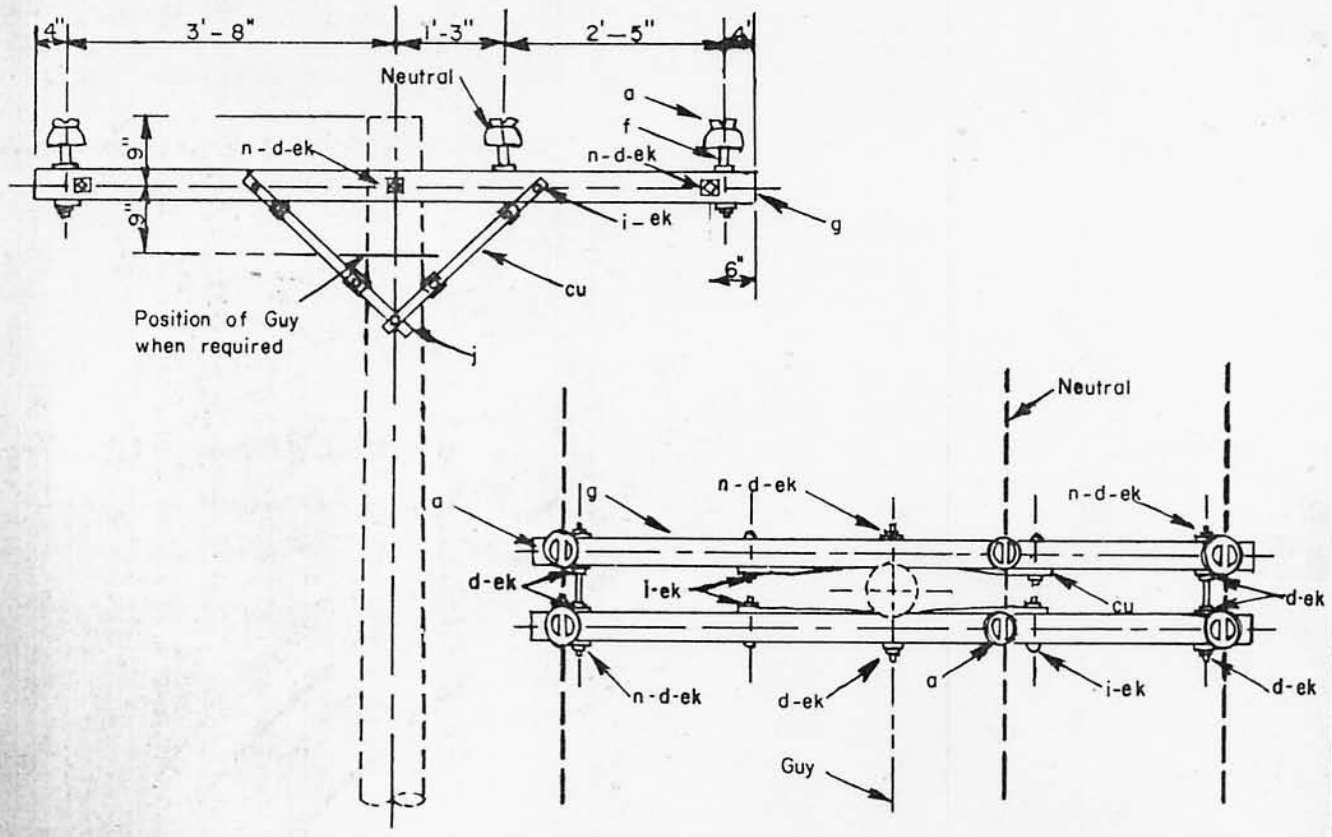
NOTE:
Use with M3-11, M3-11A,
ADD M5-1 for through line

SECTION X-X

ITEM	NO.	MATERIAL		ITEM	NO.	MATERIAL	
d	12	Washer, 2-1/4" x 2-1/4" x 3/16", 13/16" hole.		bn	4	Clamp, loop deadend	
g	2	Crossarm, 3-1/2" x 4-1/2" x 8'-0"		o	1	Bolt, eye, 5/8" x 10"	
c	4	Bolt, machine, 1/2" x 6"		p	1	Connectors, **compression**	
c	1	Bolt, machine, 5/8" x 10"		aa	5	Nut, eye, 5/8"	
cu	2	Brace Wood, 60" span		aq		Leads and Jumpers, as required	
k	8	Insulator, suspension		l	4	Clamp, deadend	
n	3	Bolt, double arming, 5/8" x 20"		ek	4	Locknuts, 1/2"	
s	2	Clevis, secondary, swinging		ek	7	Locknuts, 5/8"	
cm	2	Spool Insulator, 1-3/4" dia groove		d	4	Washer, round, 1-3/8" dia. 9/16" hole	
T	2	Armor tape *					

* - Conductor Accessories

7.62/13.2 KV., TWO-PHASE
CROSSARM CONSTRUCTION - DEADEND (DOUBLE)



PLAN

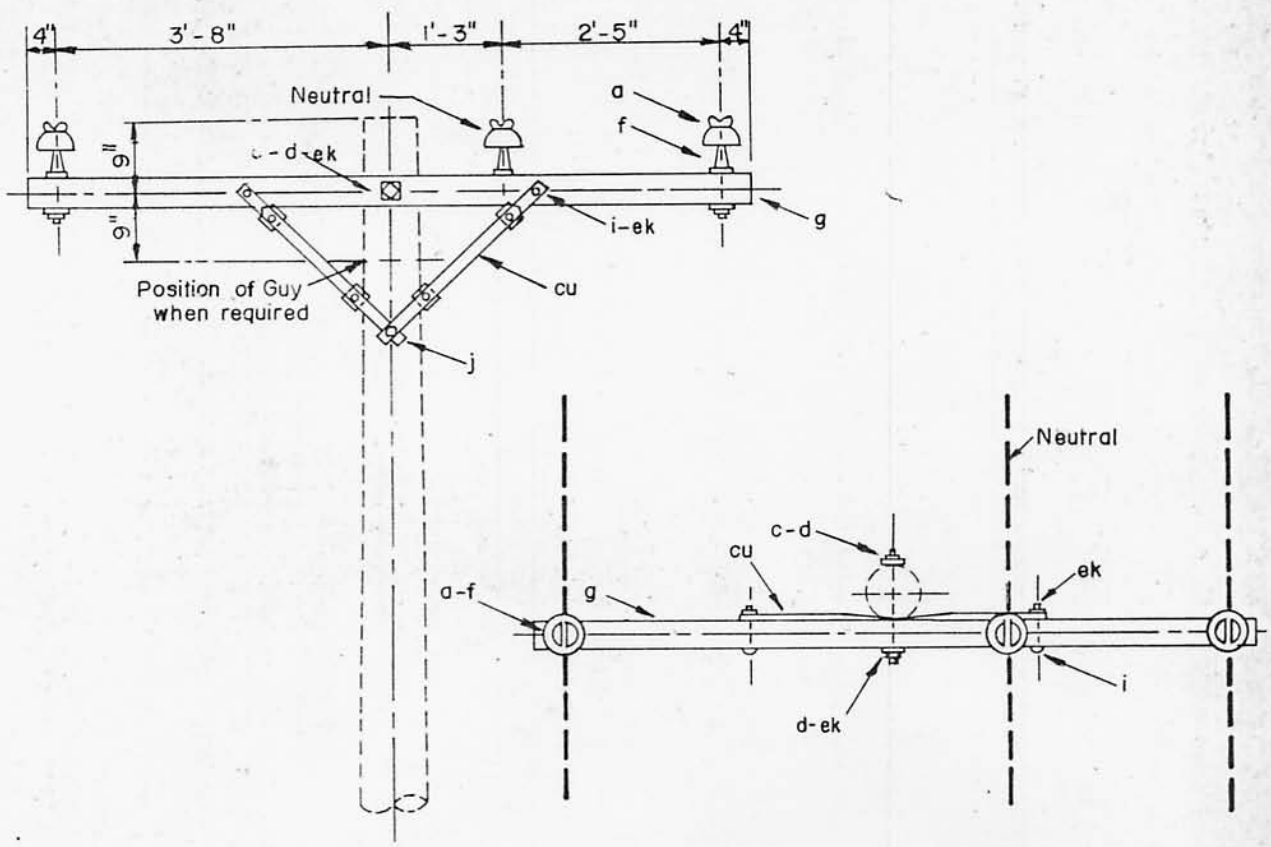
ITEM	NO.	MATERIAL		ITEM	NO.	MATERIAL	
a	6	Insulator, pin type		j	2	Screw, lag, 1/2" x 4"	
d	10	Washer, 2-1/4" x 2-1/4" x 3/16", 13/16" hole.		n	3	Bolt, double arming, 5/8" x 20"	
f	6	Pin, crossarm, steel, 5/8" x 10-3/4"		cu	4	Brace, wood, 28"	
g	2	Crossarm, 3-1/2" x 4-1/2" x 8'-0"		ek	10	Locknuts, 5/8"	
i	4	Bolt, carriage, 3/8" x 4-1/2"		ek	4	Locknuts, 3/8"	
bv-2	3	Armor Rod (Double Support) *					
TW	48'	Tie Wire *					

* - Conductor Accessories

7.62/13.2 KV.
TWO-PHASE, CROSSARM CONSTRUCTION
DOUBLE LINE ARM

MAY 15,1973

B9



PLAN

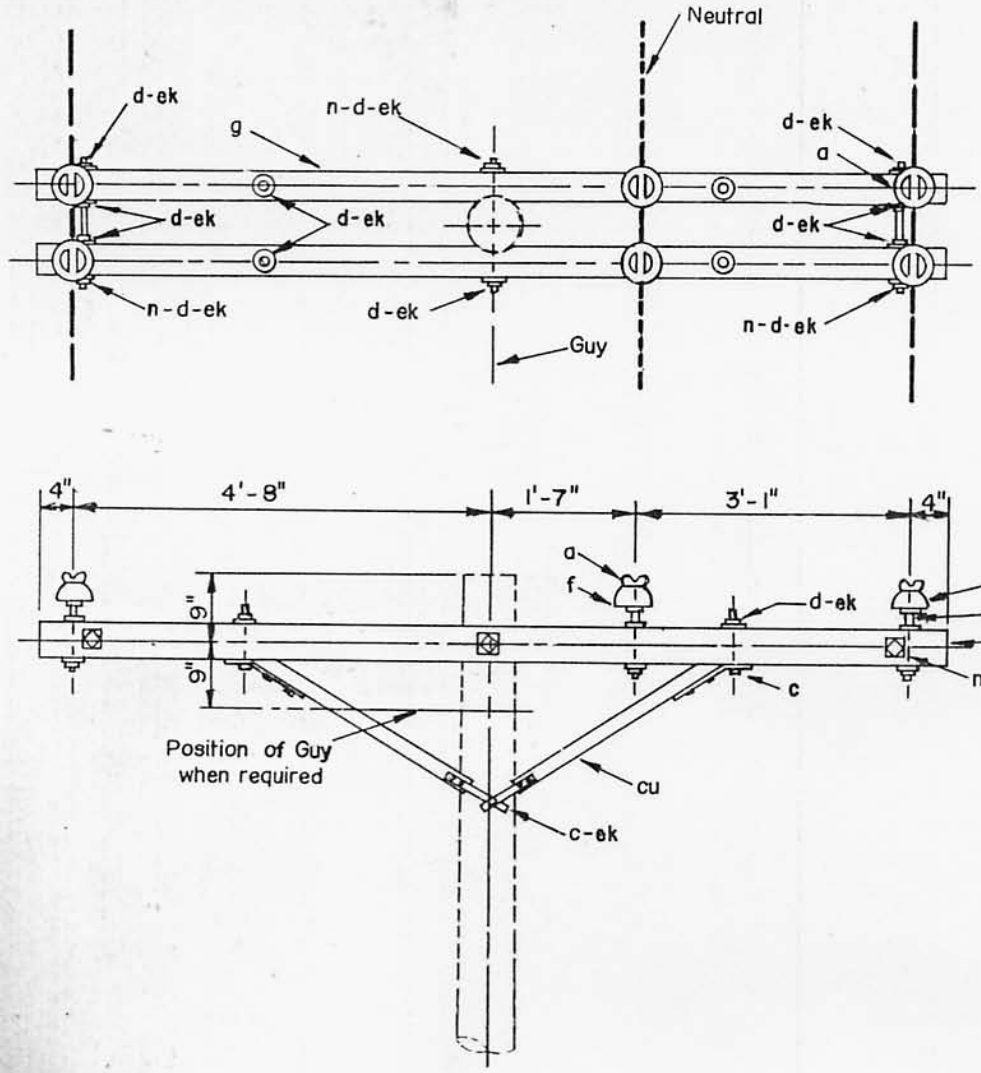
ITEM	NO.	MATERIAL		ITEM	NO.	MATERIAL	
a	3	Insulator, pin type		cu	2	Brace, wood, 28"	
c	1	Bolt, machine, 5/8" x 14"		i	2	Bolt, carriage, 3/8" x 4-1/2"	
d	2	Washer, 2-1/4" x 2-1/4" x 3/16", 13/16" hole		j	1	Screw, lag, 1/2" x 4"	
f	3	Pin, crossarm, steel, 5/8" x 10-3/4"		ek	1	Locknuts, 5/8"	
g	1	Crossarm, 3-1/2" x 4-1/2" x 8'-0"		ek	2	Locknuts, 3/8"	
bv-1	3	Armor Rod (Single Support) *					
TW	24'	Tie Wire *					

* - Conductor Accessories

7.62/13.2 KV.
TWO PHASE, CROSSARM CONSTRUCTION
SINGLE LINE ARM

MAY 15, 1973

B9-1



NOTE:

This construction should be used where future conversion to three phase is likely.

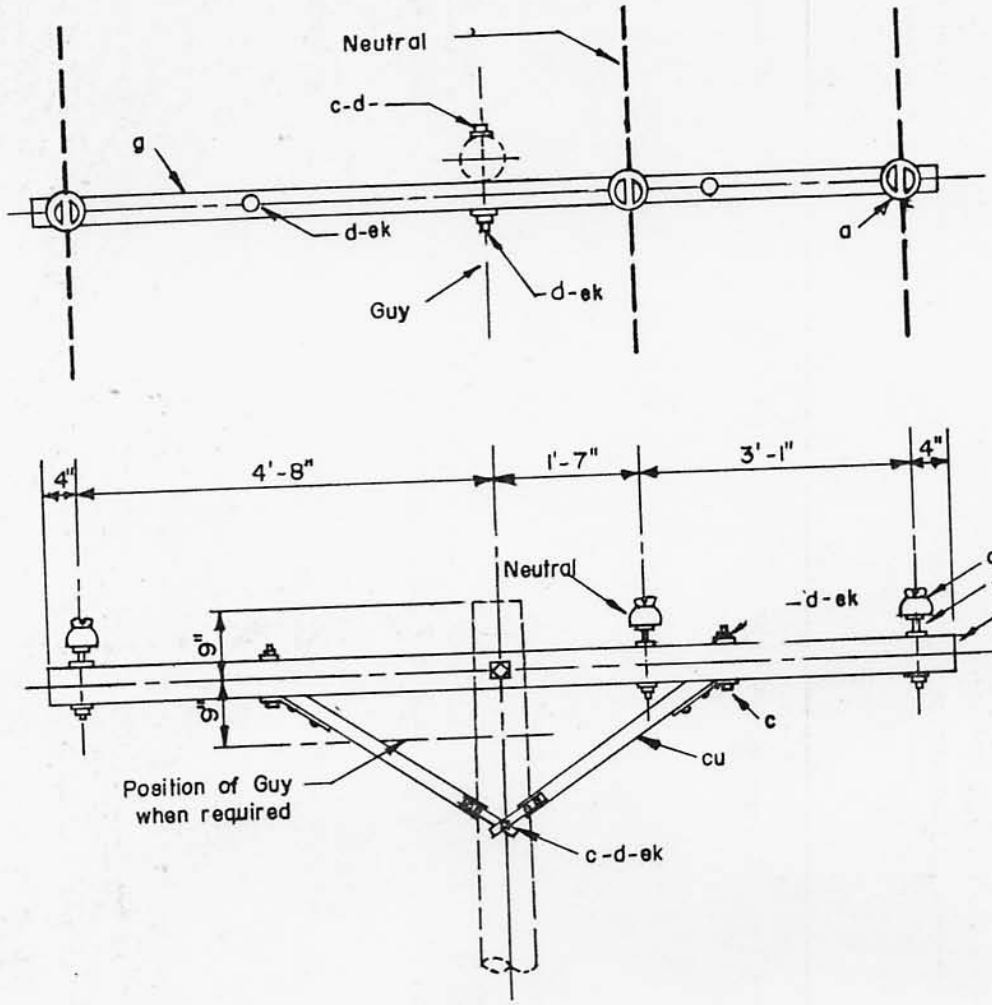
ITEM	NO.	MATERIAL		ITEM	NO.	MATERIAL	
a	6	Insulator, pin type		g	2	Crossarm, 3-3/4" x 4-3/4" x 10'-0"	
c	1	Bolt, machine, 5/8" x 10"		n	3	Bolt, double arming, 5/8" x 20"	
c	4	Bolt, machine, 1/2" x 6"		cu	2	Brace, wood, 60" span	
d	10	Washer, 2-1/4" x 2-1/4" x 3/16", 13/16" hole.		ek	11	Locknuts, 5/8"	
d	4	Washer, round, 1-3/8", 9/16" hole.		ek	4	Locknuts, 1/2"	
f	6	Pin, crossarm, steel, 5/8" x 10-3/4"		bv-2	3	Armor Rod (Double Support) *	
TW	48'	Tie Wire *					

* - Conductor Accessories

7.62/13.2 KV., TWO PHASE CROSSARM CONSTRUCTION—DOUBLE LINE ARM

MAY 15, 1973

B9-2



NOTE:
This construction should be used where future conversion to three phase is likely.

ITEM	NO.	MATERIAL
a	3	Insulator, pin type
c	1	Bolt, machine, 5/8" x 10"
c	2	Bolt, machine, 1/2" x 6"
d	3	Washer, 2-1/4" x 2-1/4" x 3/16", 13/16" hole.
d	2	Washer, round, 1-3/8" dia., 9/16" hole"
c	1	Bolt, machine, 5/8" x 14"
TW	24'	Tie Wire *

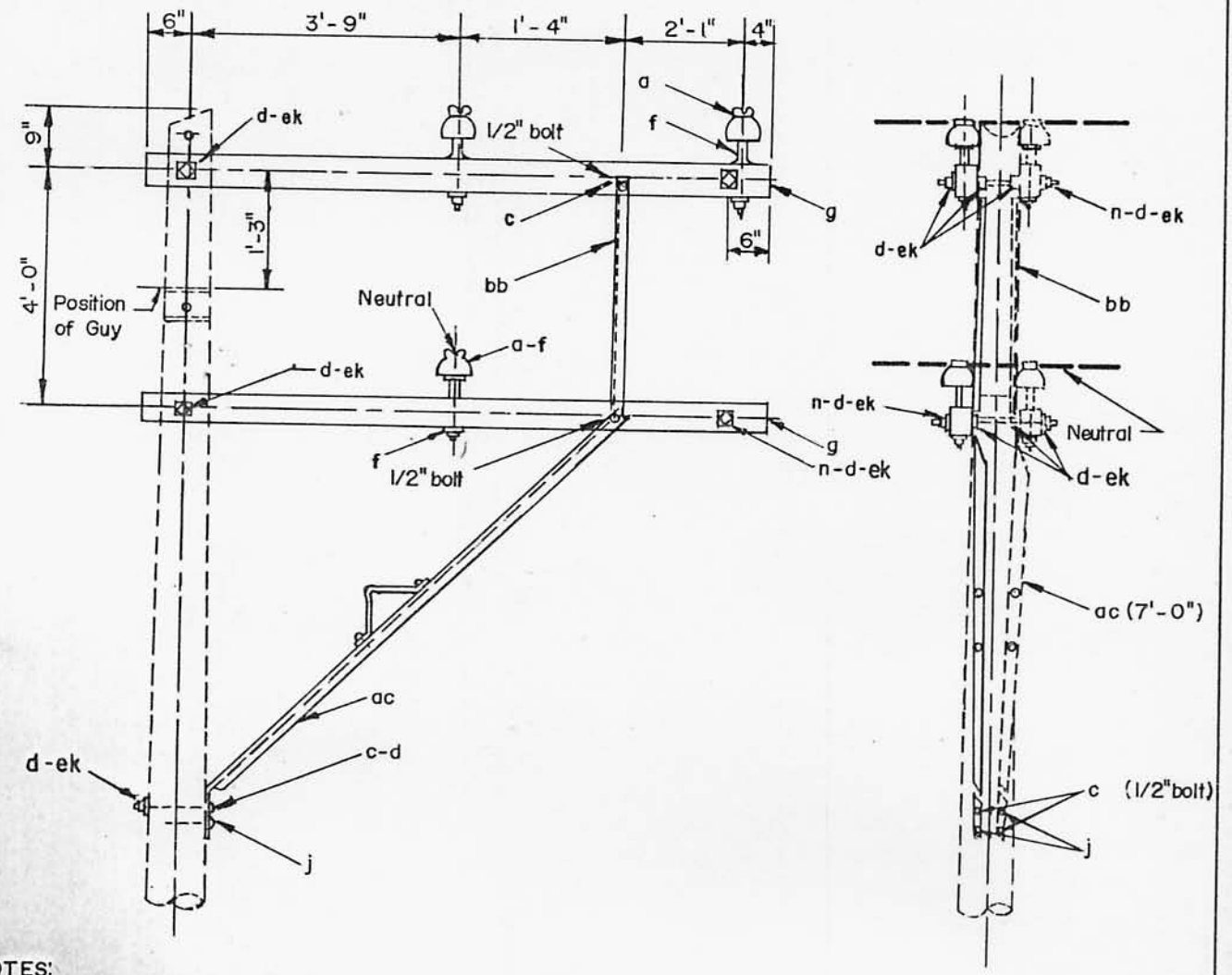
ITEM	NO.	MATERIAL
f	3	Pin, crossarm, steel, 5/8" x 10-3/4"
g	1	Crossarm, 3-3/4" x 4-3/4" x 10'-0"
cu	1	Brace, wood, 60" span
ek	2	Locknuts, 1/2"
ek	2	Locknuts, 5/8"
bv-1	3	Armor Rod (Single Support) *

* – Conductor Accessories

7.62 / 13.2 KV.
TWO-PHASE, CROSSARM CONSTRUCTION
SINGLE LINE ARM

MAY 15, 1973

B9-3



NOTES:

1. Add Ground Assembly As Required.
2. Where these assemblies are required, spans shall be shortened, as at crossings.
3. Neutral may be changed in the field as directed by the Engineers.

ITEM	NO. REQ'D B14	NO. REQ'D B15	MATERIAL
a	3	6	Insulator, pin type
c	2	0	Bolt, machine, 5/8" x 14"
c	2	4	Bolt, machine, 1/2" x 6"
c	1	2	Bolt, machine, 1/2" x 10"
d	4	12	Washer, 2-1/4" x 2-1/4" x 3/16", 13/16" hole
d	3	6	Washer, round, 1-3/8" diam., 9/16" hole.
f	3	6	Pin, crossarm, steel, 5/8" x 10-3/4"
bv 2		3	Armor Rod (Double Support) *
TW	24'	48'	Tie Wire *
bv	3		Armor Rod (Single Support)

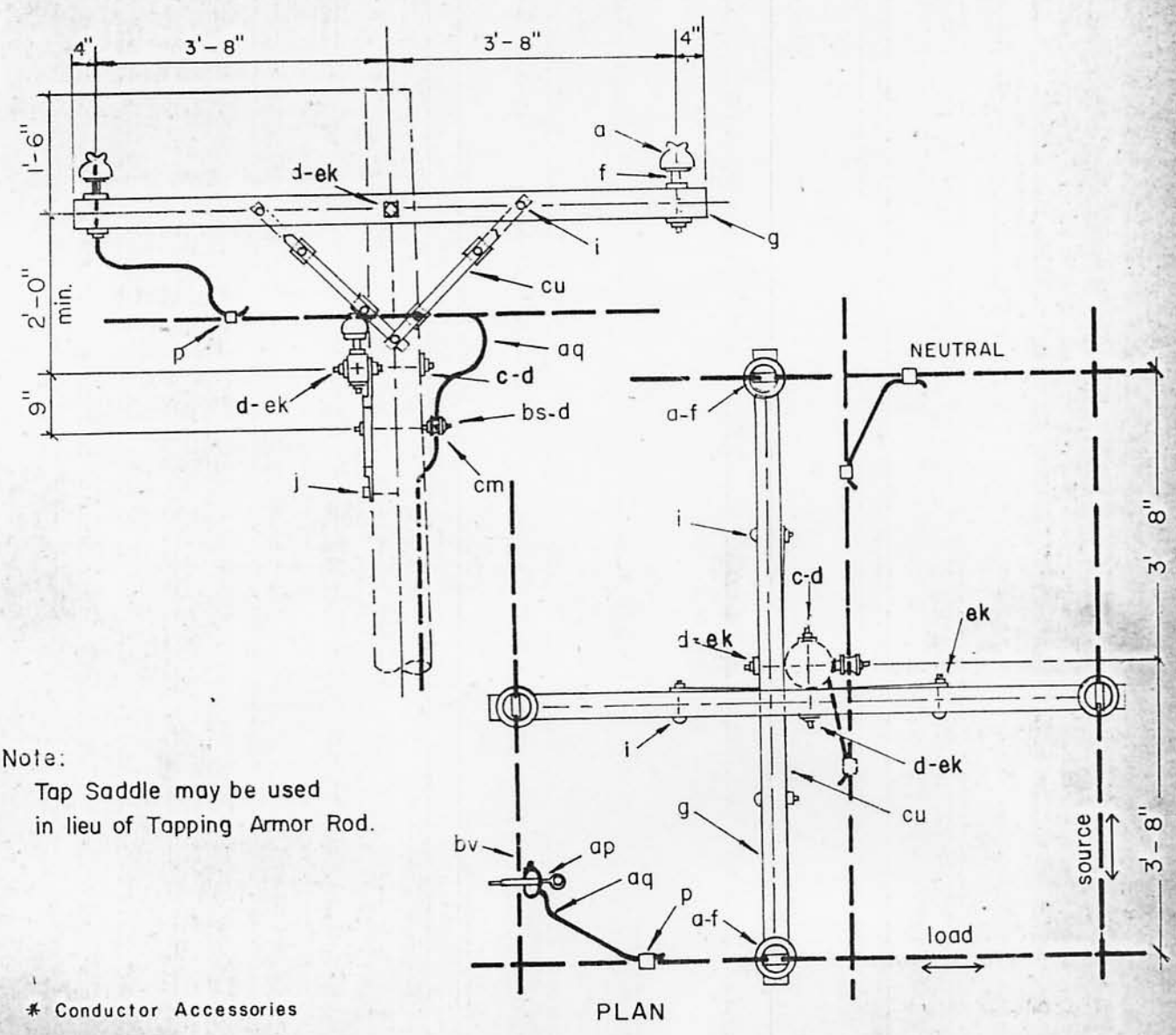
ITEM	NO. REQ'D. B14	NO. REQ'D. B15	MATERIAL
g	2	4	Crossarm, 3-1/2" x 4-1/2" x 8'-0"
j	1	2	Screw, lag, 1/2" x 4"
n	0	4	Bolt, double arming, 5/8" x 20"
ac	1	2	Brace, side arm diagonal, 1-3/4" angle, 3/16" x 7'
bb	1	2	Brace, side arm vertical, angle, 50"
ek	2	12	Locknuts, 5/8"
ek	3	6	Locknuts, 1/2"

* - Conductor Accessories

7.62 / 13.2 KV.
TWO-PHASE, SIDEARMS CONSTRUCTION
(FOR SINGLE, DOUBLE PRIMARY SUPPORTS)

MAY 15, 1973

B14, B15



PLAN

Note:
Tap Saddle may be used
in lieu of Tapping Armor Rod.

* Conductor Accessories

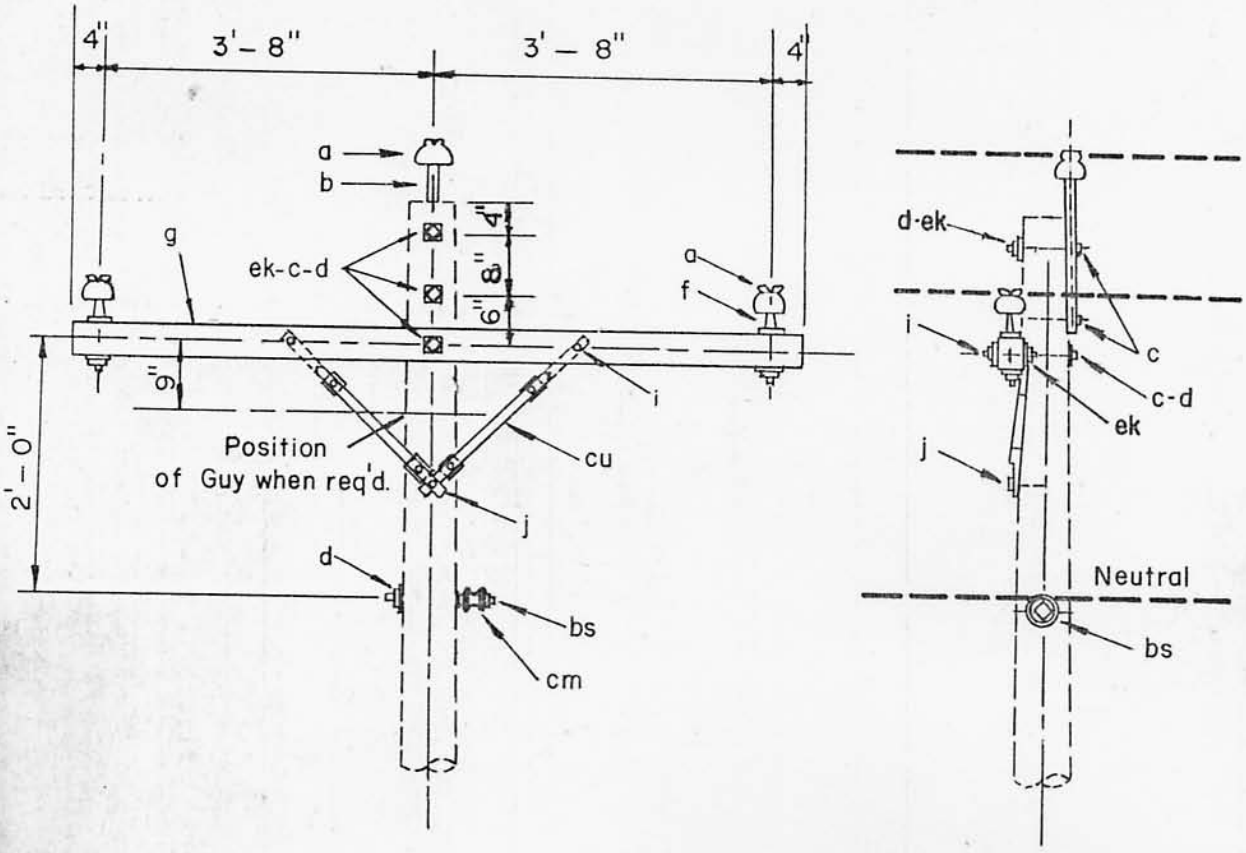
ITEM	NO.	MATERIAL
a	4	Insulator, pin type
c	2	Bolt, machine, 5/8"x 14"
d	5	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16 hole
f	4	Pin, crossarm, steel 5/8" x 10 1/4"
g	2	Crossarm, 3 1/2" x 4 1/2" x 8'-0"
cu	4	Brace, wood, 28"
ek	4	Locknut 3/8"
ap	1	Hotline clamp
cm	1	Spool Insulator, 1 3/4" dia. Groove
bv	1	Armor rod (Tapping) *
bv-1	5	Armor rod (Single Support) *
Tw	40'	Tie wire *

ITEM	NO.	MATERIAL
i	4	Bolt, carriage, 3/8" x 4 1/2"
j	2	Screw, lag, 1/2" x 4"
p	4	Connectors, compression
aq		Jumpers and leads, as required
bs	1	Bolt, single upset, 3/8"x 10"
ek	2	Locknut, 5/8"

7.62/13.2 KV.
TWO PHASE, CROSSARM CONSTR.-
SINGLE PHASE JUNCTION AT 0° TO 5° ANGLE

MAY 15, 1973

B 22



* Conductor Accessories

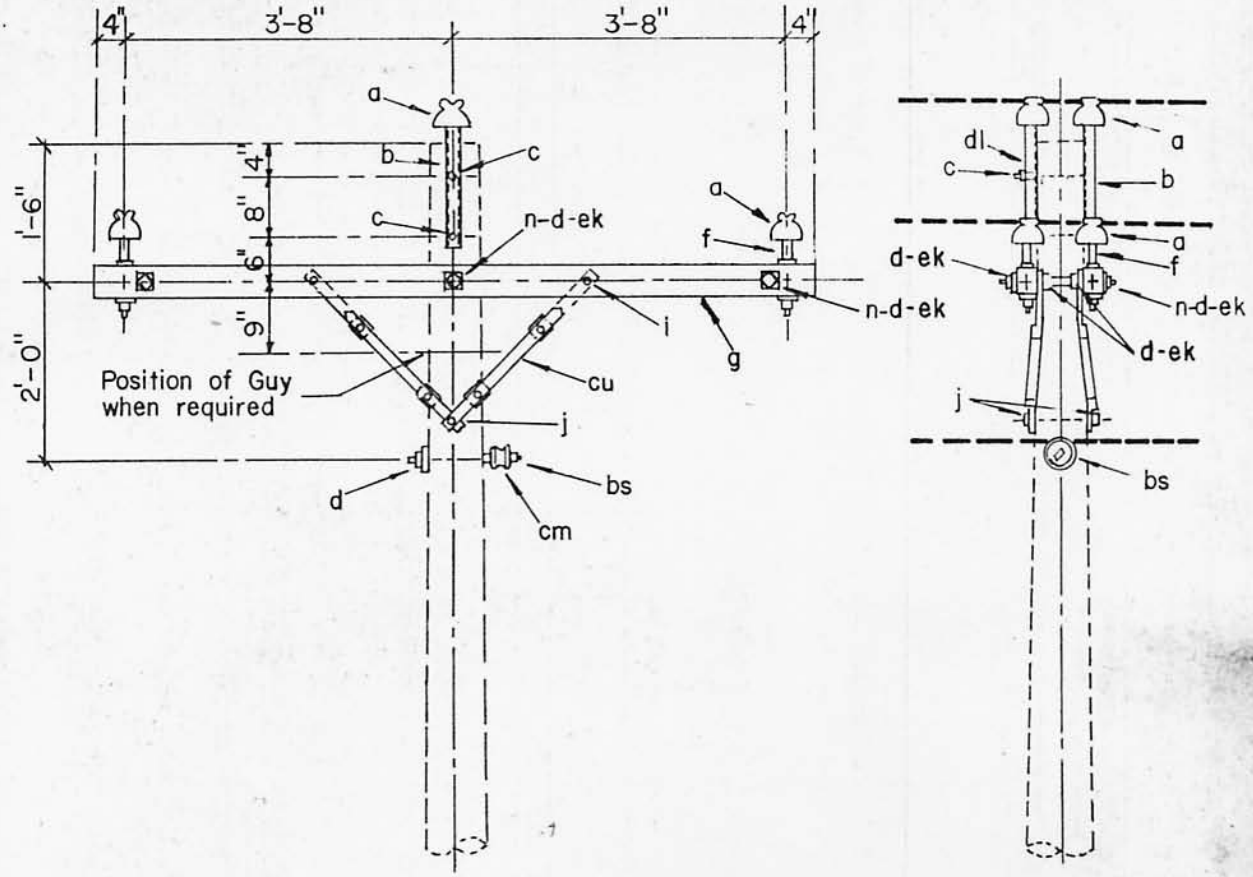
ITEM	NO.	MATERIAL
a	3	Insulator, pin type
b	1	Pin, pole top, 20"
c	2	Bolt, machine, 5/8" x 10"
d	5	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16 hole
f	2	Pin, Crossarm, steel, 5/8" x 10 3/4"
g	1	Crossarm, 3 1/2" x 4 1/2 x 8'–0"
c	1	Bolt, machine, 5/8" x 14"
bv-1	4	Armor rod, (Single Support) *
Tw	32'	Tie wire *
ek	3	Locknut, 5/8"

ITEM	NO.	MATERIAL
cu	2	Brace, wood, 28"
l	2	Bolt, carriage, 3/8" x 4 1/2"
j	1	Screw, lag, 1/2" x 4"
bs	1	Bolt, single upset, 5/8" x 10"
cm	1	Spool insulator, 1 3/4" dia. groove
ek	2	Lacknut, 3/8"

7.62 / 13.2 KV.
3-PHASE CROSSARM CONSTRUCTION
SINGLE PRIMARY SUPPORT AT 0° TO 5° ANGLE

MAY 15, 1973

C 1



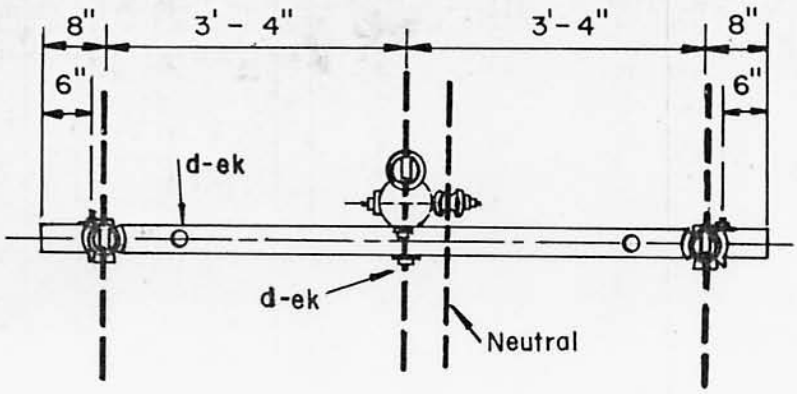
* Conductor Accessories

ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
a	6	Insulator, pin type	cu	4	Brace, wood, 28"
b	2	Pin, pole top, 20"	cm	1	Insulator, spool, 1 3/4"
c	2	Bolt, machine; 5/8"x 12"	dl	2	Pipe spacer, 3/4"dia. x 1 1/2"
d	11	Washer, 2 1/4"x 2 1/4" x 3/16", 13/16" hole	tw	56'	Tie wire *
f	4	Pin, crossarm, steel, 5/8"x 10 3/4"			
g	2	Crossarm, 3 1/2" x 4 1/2" x 8'-0"			
i	4	Bolt, carriage, 3/8"x 4 1/2"			
j	2	Screw, lag, 1/2"x 4"			
n	3	Bolt, double arming, 5/8"x 18"			
bs	1	Bolt, single upset, 5/8"x 10"			
bv-1	1	Armor rod (single support)*			
bv-2	3	Armor rod (double support)*			
ek	13	Locknut, 5/8"			
ek	4	Locknut, 3/8"			

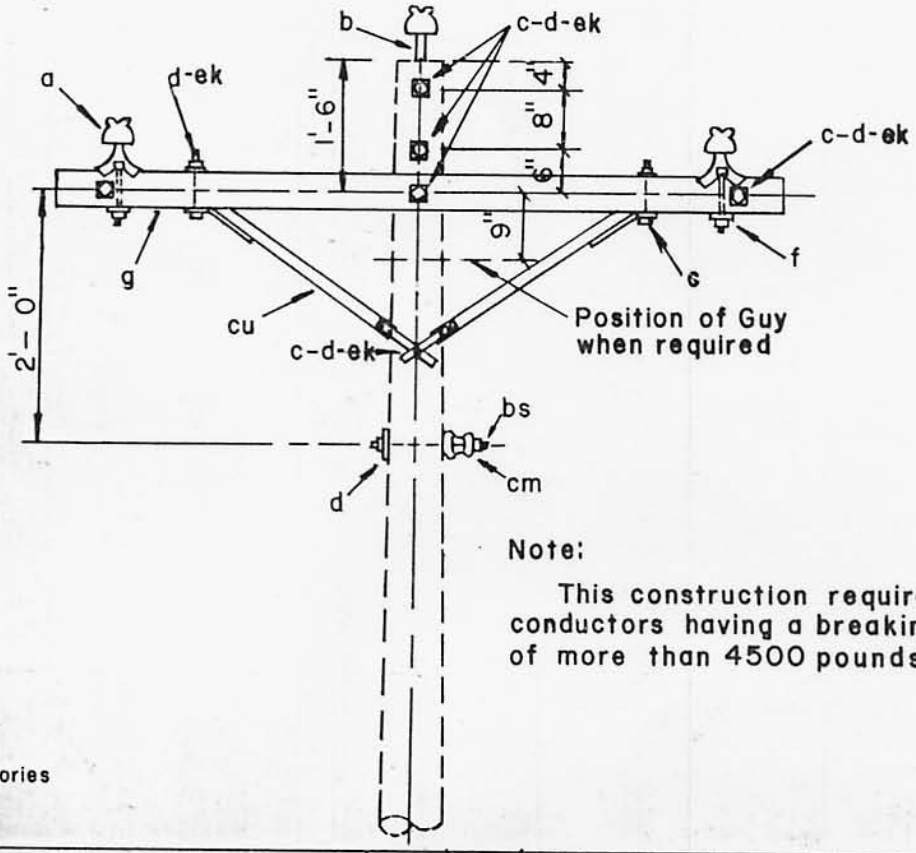
7.62/13.2 KV 3-PHASE CROSSARM CONSTRUCTION
DOUBLE PRIMARY SUPPORT AT 0° TO 5° ANGLE

MAY 15, 1973

C1-1



PLAN



Note:

This construction required for all conductors having a breaking strength of more than 4500 pounds.

* Conductor Accessories

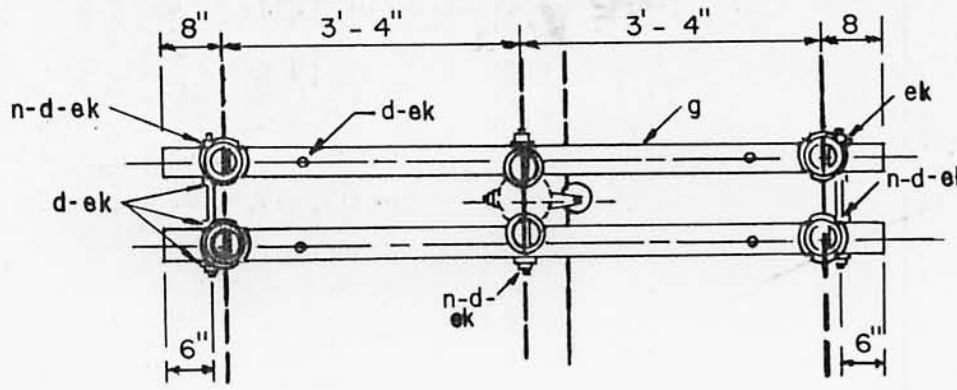
ITEM	NO.	MATERIAL
a	3	Insulator, pin type
b	1	Pin, pole top, 20"
c	2	Bolt, machine, 1/2" x 6"
c	2	Bolt, machine, 5/8" x 5"
c	3	Bolt, machine, 5/8" x 12"
c	1	Bolt, machine, 5/8" x 16"
d	10	Washer, 2 1/4" x 2 1/4 x. 3/16, 13/16hole
ek	2	Locknut 1/2"
d	2	Washer, rd. 1 3/8" diam, 9/16" hole
Tw	32	Tie wire *
bv-1	4	Armor rod (Single Support) *

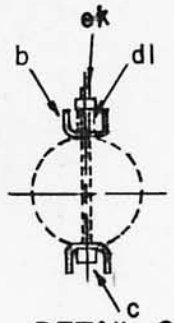
ITEM	NO.	MATERIAL
f	2	Pin, crossarm, clamp type
g	1	Crossarm, 3 3/4" x 4 3/4" x 8'-0
bs	1	Bolt, single upset, 12"
cu	1	Brace, wood, 60" span
ek	6	Locknut 5/8"
cm	1	Spool insulator, 1 3/4" dia. groove

7.62/13.2 KV. 3-PHASE CROSSARM CONSTRUCTION AT 0° TO 2° ANGLE (LARGE CONDUCTORS)

MAY 15, 1973

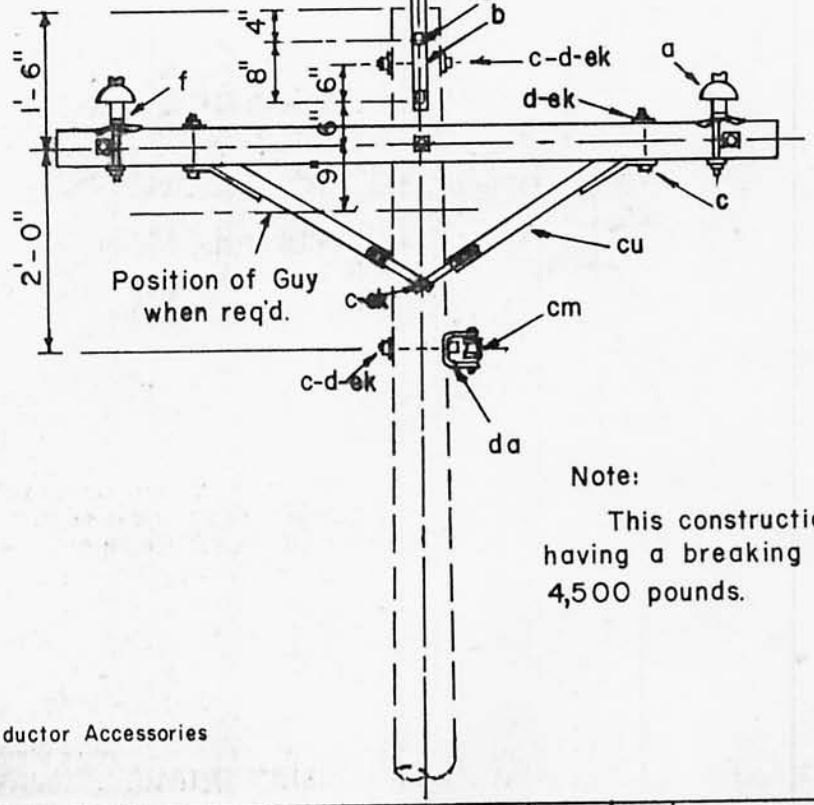
C1-2





DETAIL OF POLE TOP PIN ASSEMBLY

PLAN



Note:

This construction required for all conductors having a breaking strength of more than 4,500 pounds.

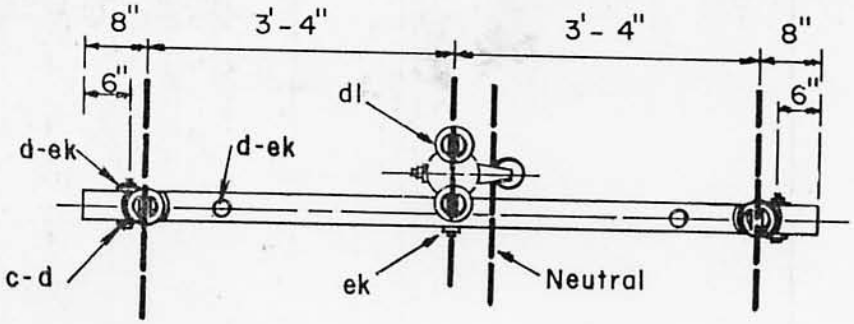
* Conductor Accessories

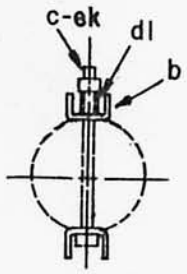
ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
a	6	Insulator, pin type	g	2	Crossarm, 3 3/4" x 4 3/4" x 8'-0"
b	2	Pin, pole top, 20"	n	3	Bolt, double arming, 5/8" x 24"
c	3	Bolt, machine, 5/8" x 12"	cu	2	Brace, wood, 60" span
c	4	Bolt, machine, 1/2" x 6"	da	1	Bracket
d	13	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16 hole	ek	15	Locknut, 5/8"
d	4	Washer, rd., 1 3/8" dia. 9/16" hole	ek	4	Locknut, 1/2"
dl	2	Pipe spacer, 3/4" dia. x 1 1/2"			
f	4	Pin, crossarm steel, clamp type			
bv-1	1	Armor rod (Single Support) *			
bv-2	3	Armor rod (Double Support) *			
cm	1	Spool Insulator, 3" dia. groove			
Tw	56'	Tie wire *			
c	2	Bolt, machine, 5/8" x 14"			

7.62/13.2 KV. 3-PHASE, CROSSARM CONSTR'N DOUBLE PRIMARY SUPPORT, 0° TO 5° ANGLE (LARGE CONDUCTORS)

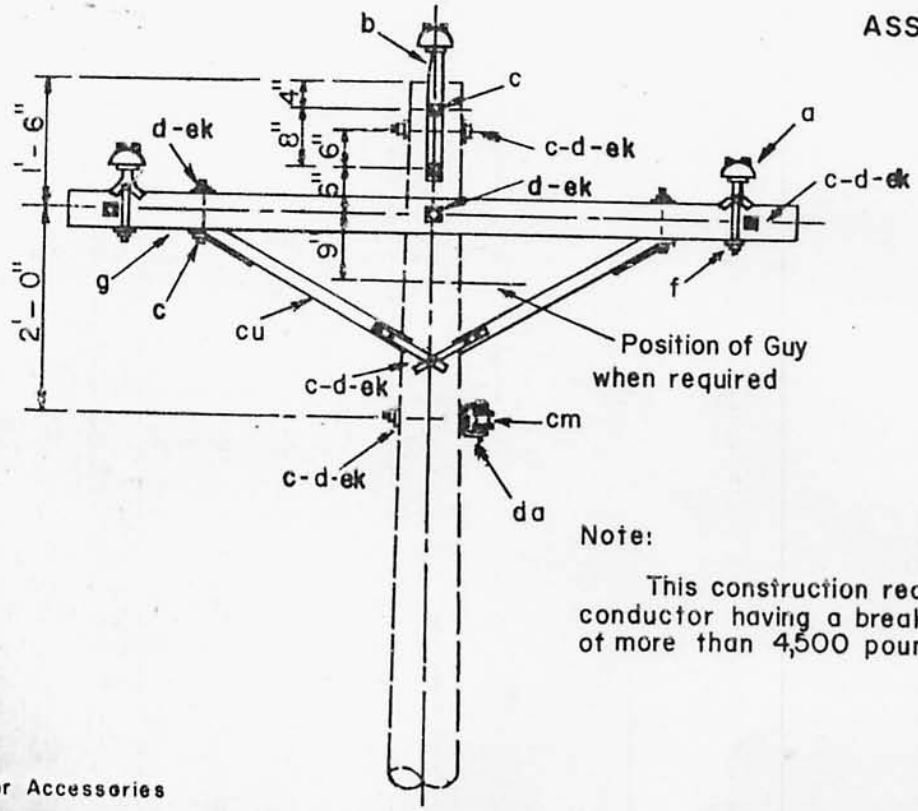
MAY 15, 1973

C1-3





POLE TOP PIN ASSEMBLY



Note:

This construction required for all conductor having a breaking strength of more than 4,500 pound.

* Conductor Accessories

ITEM	NO.	MATERIAL
a	4	Insulator, pin type
b	2	Pin, pole top, 20"
c	3	Bolt, machine, 5/8" x 12"
c	2	Bolt, machine, 1/2" x 6"
d	10	Washer, 2 1/4"x 2 1/4" x 3/16", 13/16" hole
d	2	Washer, rd., 1 3/8" dia., 9/16" hole
f	2	Pin, crossarm, clamp type
bv-1	3	Armor rod (Single Support) *
bv-2	1	Armor rod (Double Support) *
cm	1	Spool insulator, 3" dia. groove
Tw	40'	Tie wire *
c	2	Bolt, machine, 5/8" x 14"
c	1	Bolt, machine, 5/8" x 16"

ITEM	NO.	MATERIAL
g	1	Crossarm, 3 3/4" x 4 3/4" x 8'-0"
cu	1	Brace, wood, 60" span
da	1	Bracket,
dl	2	Pipe spacer, 3/4" dia. x 1 1/2"
ek	7	Locknut, 5/8"
ek	2	Locknut, 1/2"
c	2	Bolt, machine 5/8" x 5"

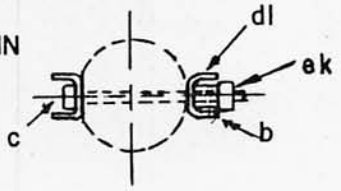
7.62/13.2 KV. 3-PHASE CROSSARM CONSTRUCTION 2° TO 5° ANGLE (LARGE CONDUCTORS)

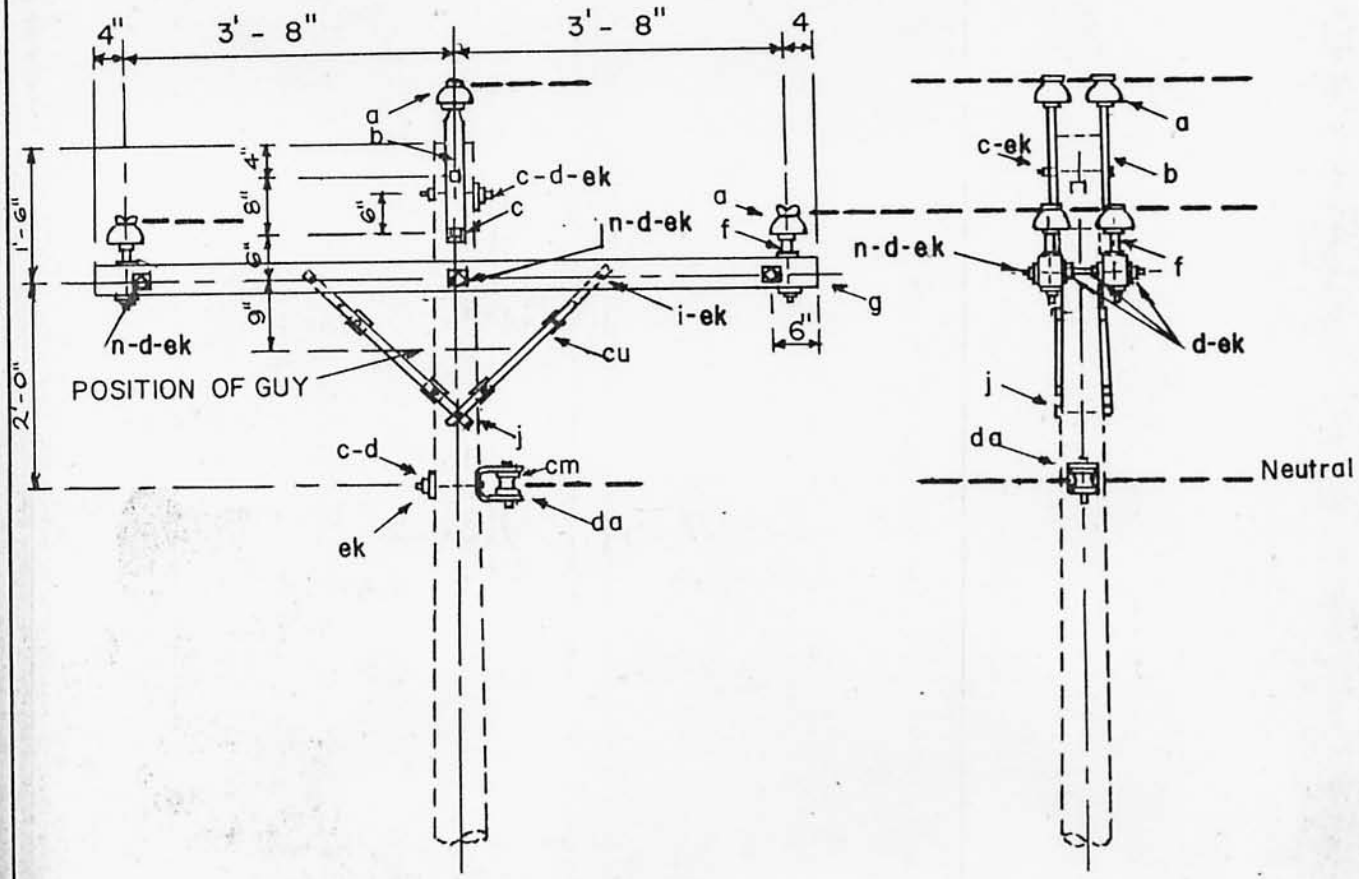
MAY 15, 1973

CI - 4

ANTI SPLIT BOLT

POLE TOP PIN ASSEMBLY





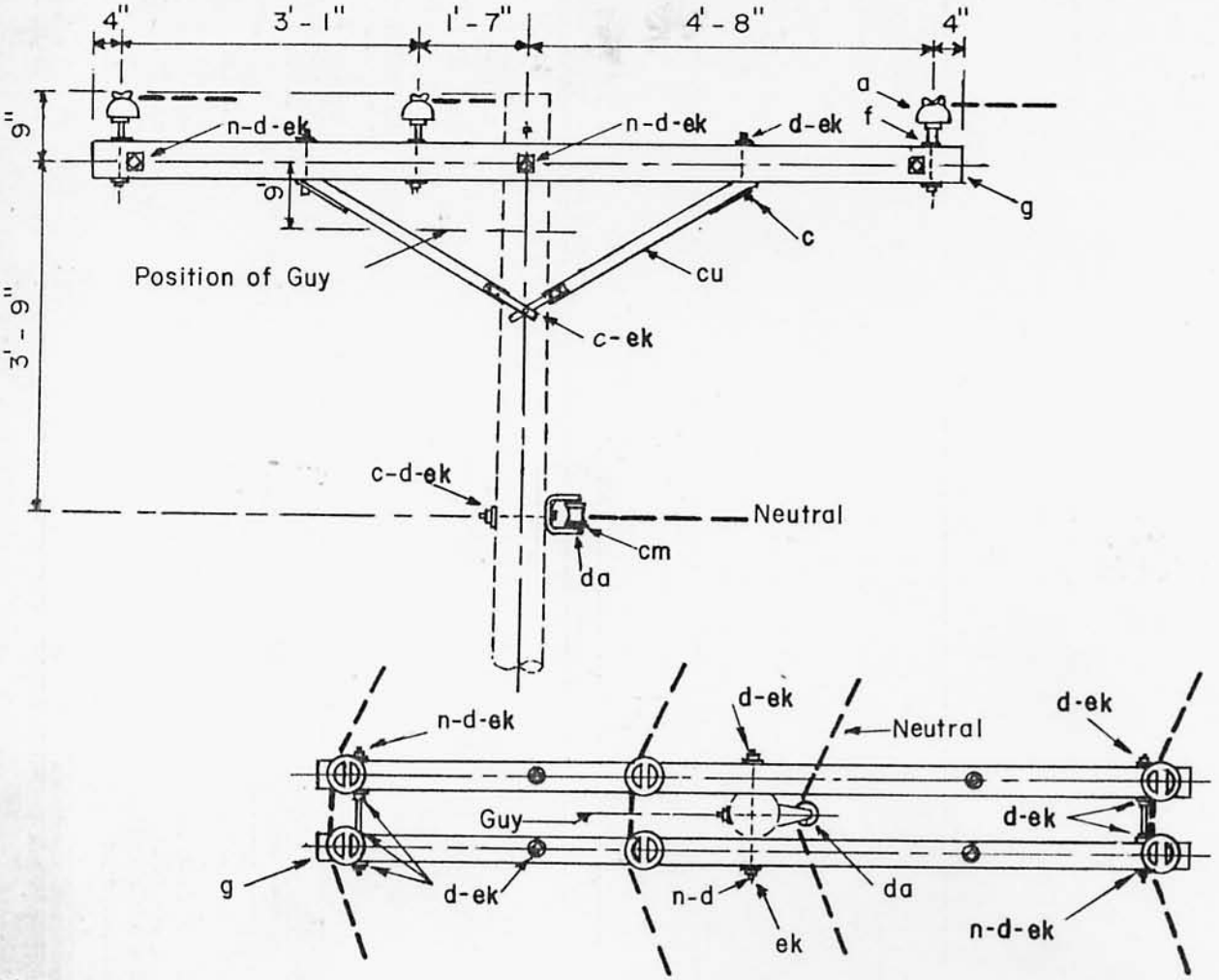
* Conductor Accessories

ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
a	6	Insulator, pin type	cu	4	Brace, wood, 28"
b	2	Pin, pole top, 20"	da	1	Bracket
c	2	Bolt, machine, 5/8" x 12"	dl	2	Pipe, spacer, 3/4" dia. x 1½"
c	2	Bolt, machine, 5/8" x 14"	ek	13	Locknut 5/8"
d	13	Washer, 2¼" x 2¼" x 3/16," 13/16" hole	ek	4	Locknut 3/8"
			Tw	56'	Tie Wire *
f	4	Pin, crossarm, steel, 5/8" x 10-3/4"			
g	2	Crossarm, 3½" x 4½" x 8'-0"			
i	4	Bolt, carriage, 3/8" x 4½"			
j	2	Screw, lag, ½" x 4"			
n	3	Bolt, double arming, 5/8" x24"			
bv-1	1	Armor Rod (Single Support) *			
bv-2	3	Armor Rod (Double Support) *			
cm	1	Spool Insulator, 3" dia. groove			

7.62/13.2 KV. 3-PHASE
CROSSARM CONSTR. DOUBLE PRIMARY SUPPORT
MAX. TRANSVERSE LOADING - 500 LBS./PIN
5° TO 30° MAX. ANGLE

May 15, 1973

C 2



Notes :

Center phase wire may be located on the opposite side of the pole where necessary to avoid crossing of wires in midspan.

PLAN

When the transverse load is more than 500 pounds per pin install a $2\frac{1}{4}$" x $2\frac{1}{4}$" x 3/16" washer on the top of the crossarm for each pin. If the load is more than 750 pounds, use the construction shown on C2-2.

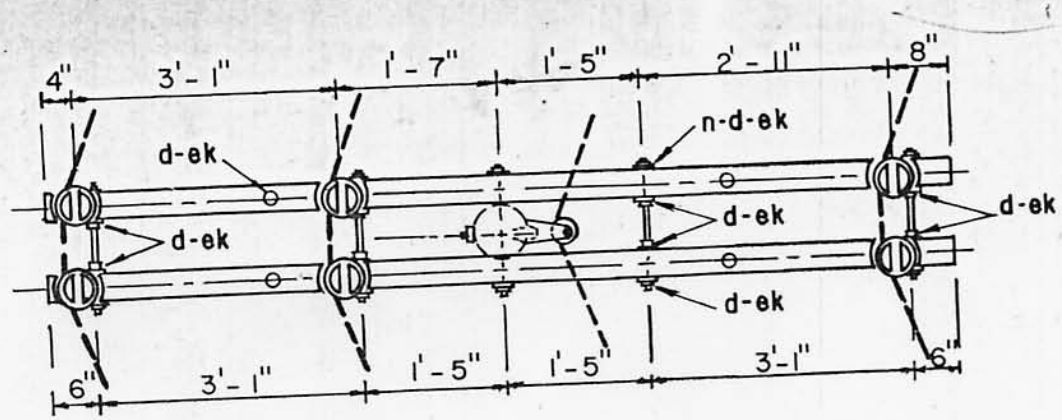
* Conductor Accessories

ITEM	NO.	MATERIAL
a	6	Insulator, pin type
c	2	Bolt, machine, 5/8" x 12"
c	4	Bolt, machine, $\frac{1}{2}$" x 6"
d	11	Washer, $2\frac{1}{4}$" x $2\frac{1}{4}$ x 3/16", x 13/16" hole
d	4	Washer, rd., 1-3/8" diam., 9/16" hole
f	6	Pin, crossarm, steel, 5/8" x 10-3/4"
g	2	Crossarm, 3-3/4" x 4-3/4" x 10'-0"
n	3	Bolt, double arming, 5/8" x 22"
bv-1	1	Armor Rod (Single Support) *
bv-2	3	Armor Rod (Double Support) *
cm	1	Spool Insulator, 3" dia., groove
cu	2	Brace, wood, 60" span
da	1	Bracket
ek	12	Locknut 5/8"
ek	4	Locknut $\frac{1}{2}$"
Tw	56'	Tie Wire *

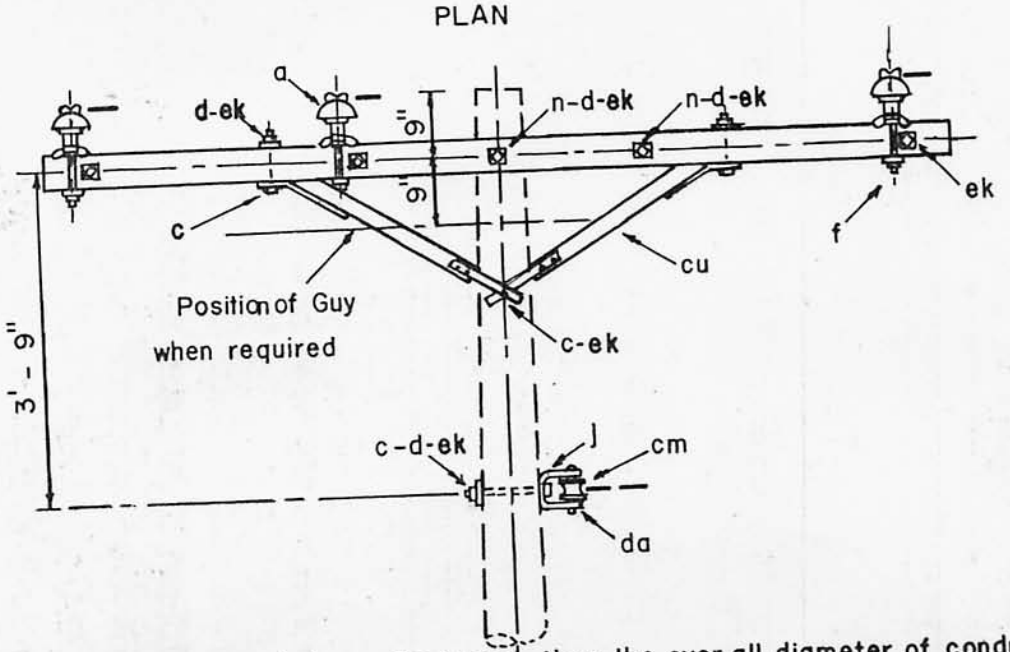
7.62/13.2 KV. 3- PHASE
CROSSARM CONSTR.-DOUBLE PRIMARY SUPPORT
MAX. TRANSVERSE LOADING 750 LBS/PIN
5° TO 30° MAX. ANGLE

May 15, 1973

C2-1



PLAN



Note:

1. Side groove of insulator must always be larger than the over all diameter of conductor including armor rods when required.
2. Center phase wire or neutral wire may be located on the opposite side of the pole where necessary to avoid crossing of wire in midspan.
3. This construction required for all conductors having a breaking strength of more than 4,500 pounds.
4. If transverse load exeeds 1000 lbs/pin, use vertical construction.

ITEM	NO.	MATERIAL
a	6	Insulator pin type
c	2	Bolt, machine, 5/8"x12"
c	4	Bolt, machine, 1/2"x6"
d	19	Washer, 2 1/4" x 2 1/4" x 3/16",13/16" hole
d	4	Washer, rd., 1 3/8" dia.,9/16" hole
f	6	Pin, crossarm, steel clamp type
g	2	Crossarm, 3 3/4" x 4 3/4" x 10'-0"
bv-1	1	Armor rod (Single Support) *
bv-2	3	Armor rod (Double Support) *
Tw	56'	Tie wire *

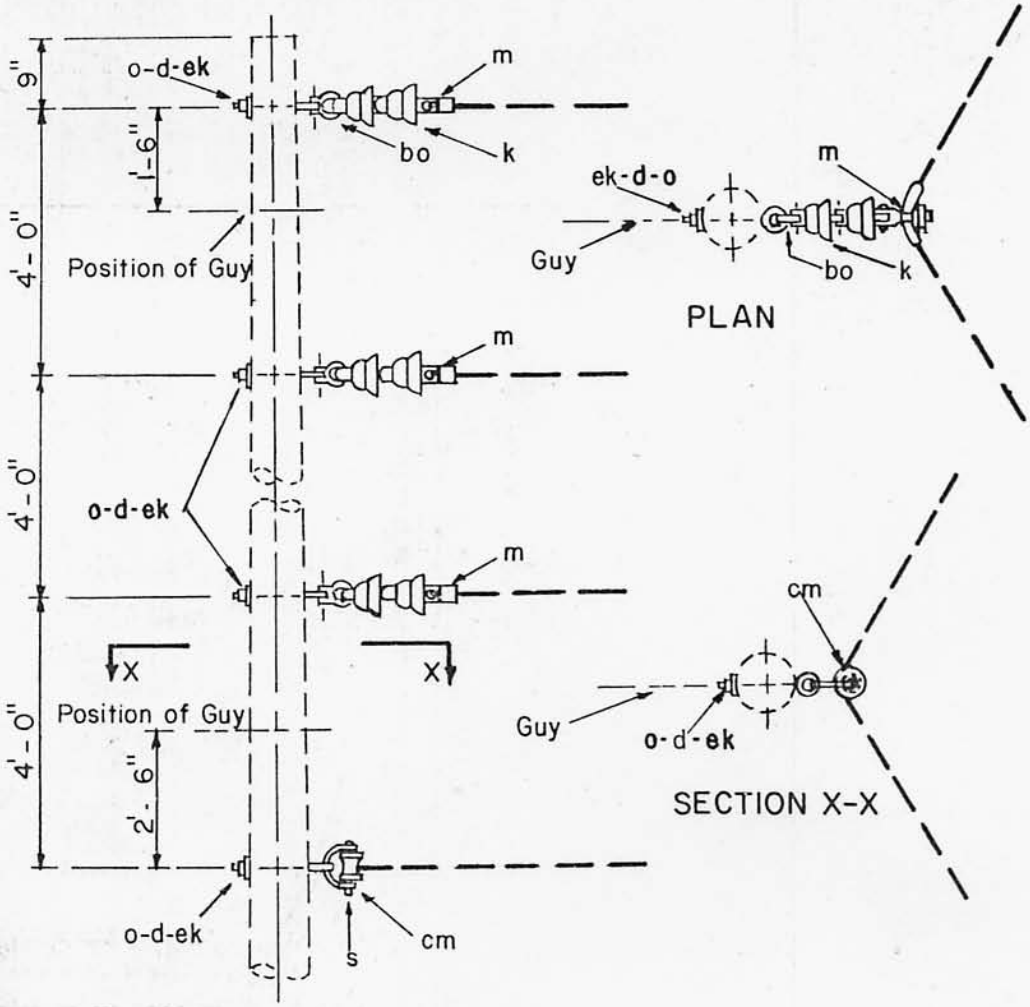
ITEM	NO.	MATERIAL
j	2	Screw lag, 1/2" x 4"
n	5	Bolt, double arming, 5/8" x 22"
da	1	Bracket
cm	1	Spool Insulator, 3" dia. groove
cu	2	Brace wood, 60" Span
ek	19	Locknut, 5/8"
ek	4	Locknut, 1/2"

* Conductor Accessories

7.62/13.2 KV. 3-PHASE CROSSARM CONSTRUCTION DOUBLE PRIMARY SUPPORT (LARGE CONDUCTORS) MAX. TRANSVERSE LOADING 1,000 LBS/PIN

MAY 15, 1973

C2 - 2



* Conductor Accessories

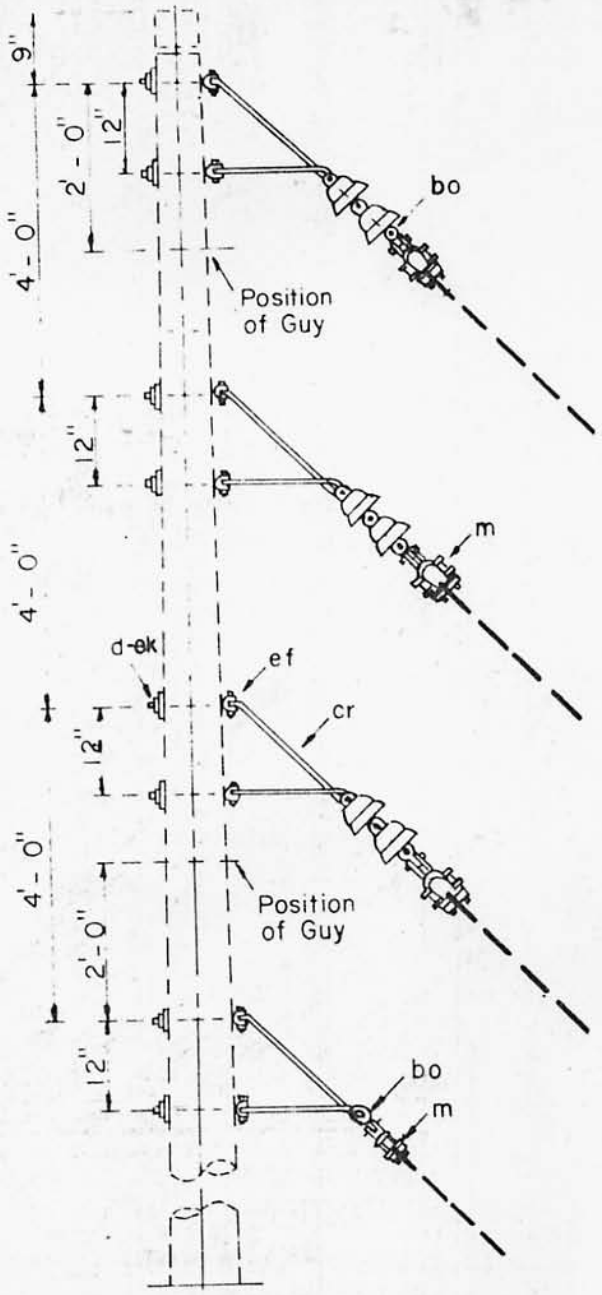
** – See M42-11

ITEM	NO.	MATERIAL		ITEM	NO.	MATERIAL
d	4	Washer, 2 1/4" x 2 1/4", x 3/16", 13/16" hole		bo	3	Shackle, anchor
k	6	Insulator, suspension		o	4	Bolt eye, 5/8" x 12"
ek	4	Locknut, 5/8"		cm	1	Spool Insulator, 3" dia. groove **
m	3	Clamp, suspension		TW	8'	Tie wire *
S	1	Clevis, secondary swinging		bv-l	4	Armor rod (Single Support) *

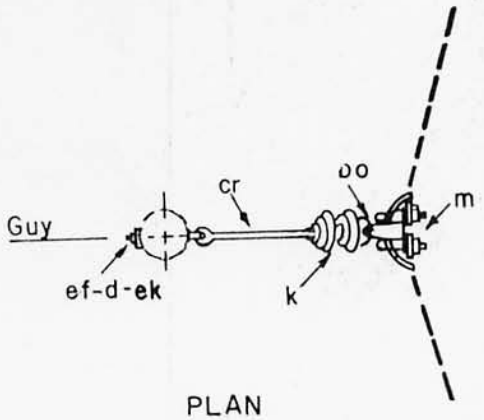
7.62/13.2 KV. THREE PHASE VERTICAL CONSTRUCTION - 30° TO 60° ANGLE

MAY 15, 1973

C-3



ELEVATION



PLAN

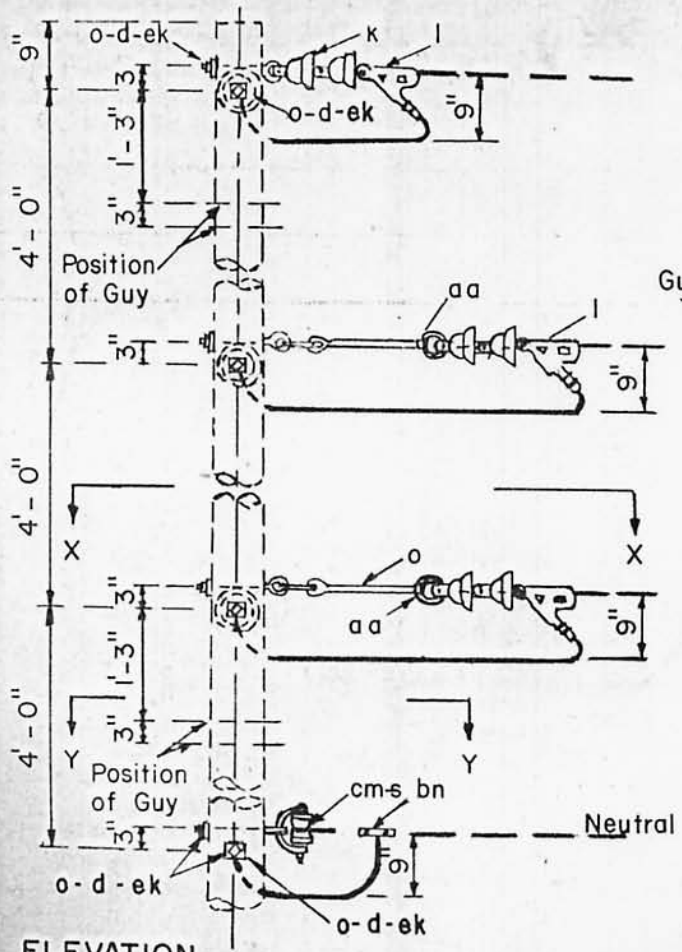
ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
d	8	Washer 2 1/4" x 2 1/4" x 3/16", 13/16" hole	bo	4	Shackle, anchor
k	6	Insulator, suspension	cr	4	Bracket, angle, 5/8"
m	4	Clamp, suspension	ef	8	Bolt, clevis, 5/8" x 12"
bv-1	4	Armor rod (Single Support) *	ek	8	Locknut, 5/8"

* Conductor Accessories

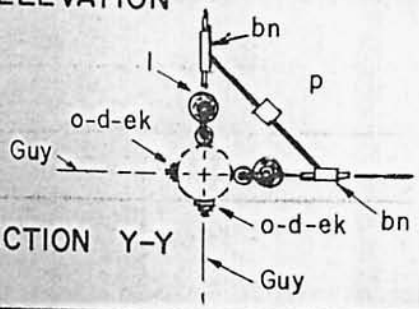
7.62/13.2 KV.
VERTICAL CONSTRUCTION
10° TO 20° ANGLE
(LARGE CONDUCTORS)

MAY 15, 1973

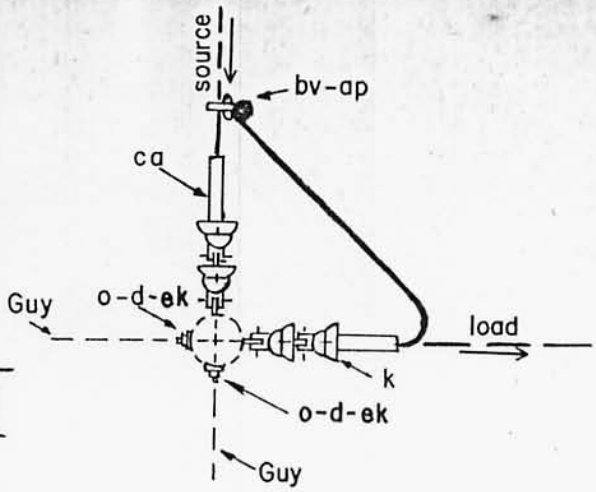
C3 - 1



ELEVATION

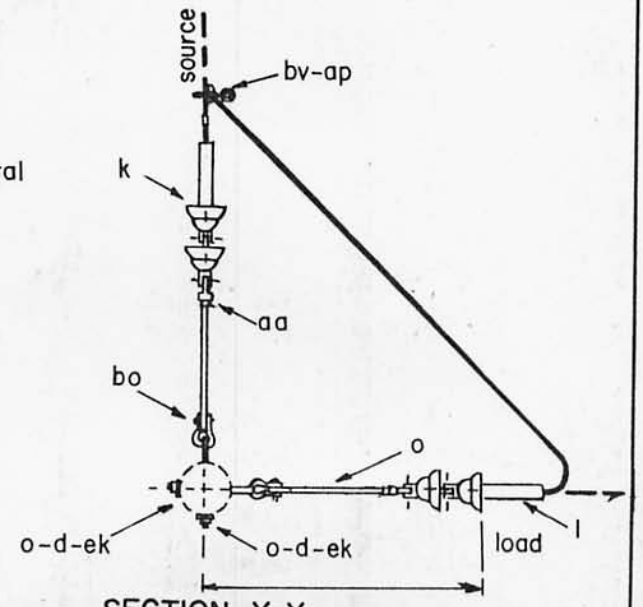


SECTION Y-Y



PLAN

Top Saddle may be used in lieu of Tapping Armor Rod.



SECTION X-X

		MATERIAL			MATERIAL
d	8	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16" hole	aq		Jumpers, as required
k	12	Insulator, suspension	bo	4	Shackle, anchor
o	8	Bolt eye, 5/8" x 12"	cm	2	Spool, insulator, 3" dia. groove. **
p	1	Connector, compression	aa	4	Nut eye, 5/8"
ek	8	Locknut, 5/8"	bn	4	Clamp, loop, deadend
o	4	Bolt, eye, 5/8" x 18"	l	6	Clamp, deadend
T	4'	Armor tape *	bv	3	Armor rod (Tapping) *
ap	3	Hotline clamp	S	2	Clevis, secondary swinging

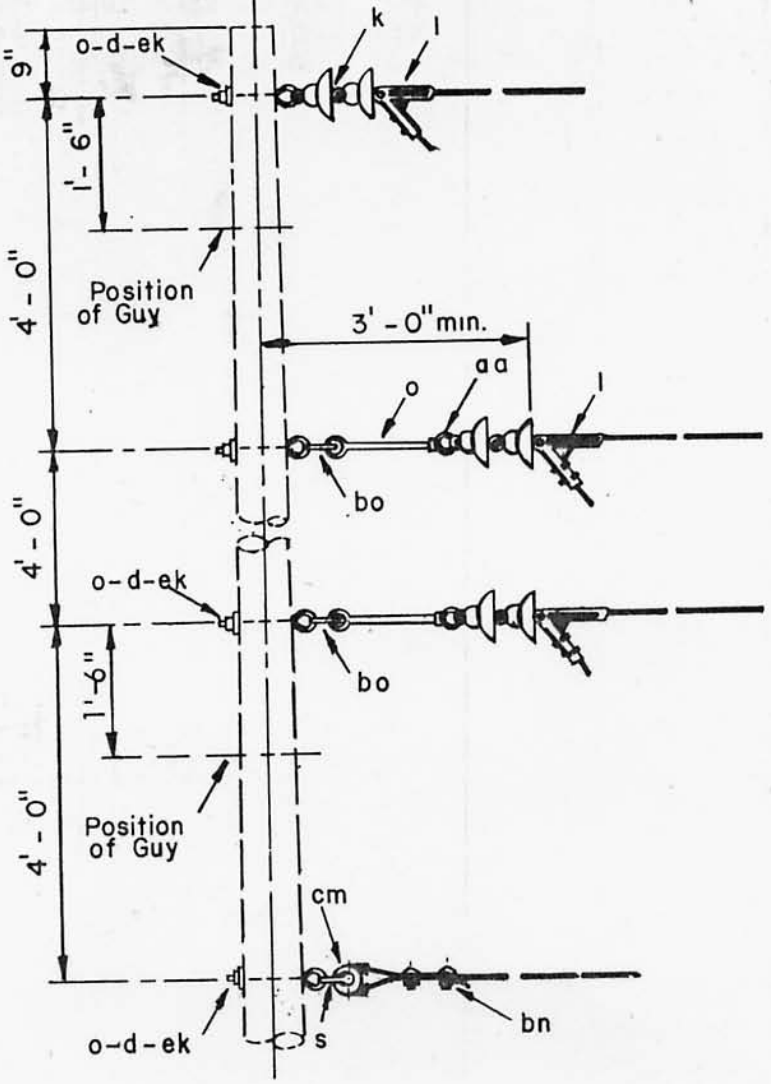
* Conductor Accessories

** See M42-11

7.62/13.2 KV. 3-PHASE VERTICAL CONSTRUCTION 60° TO 90° ANGLE

MAY 15, 1973

C4-1



** See M42-11

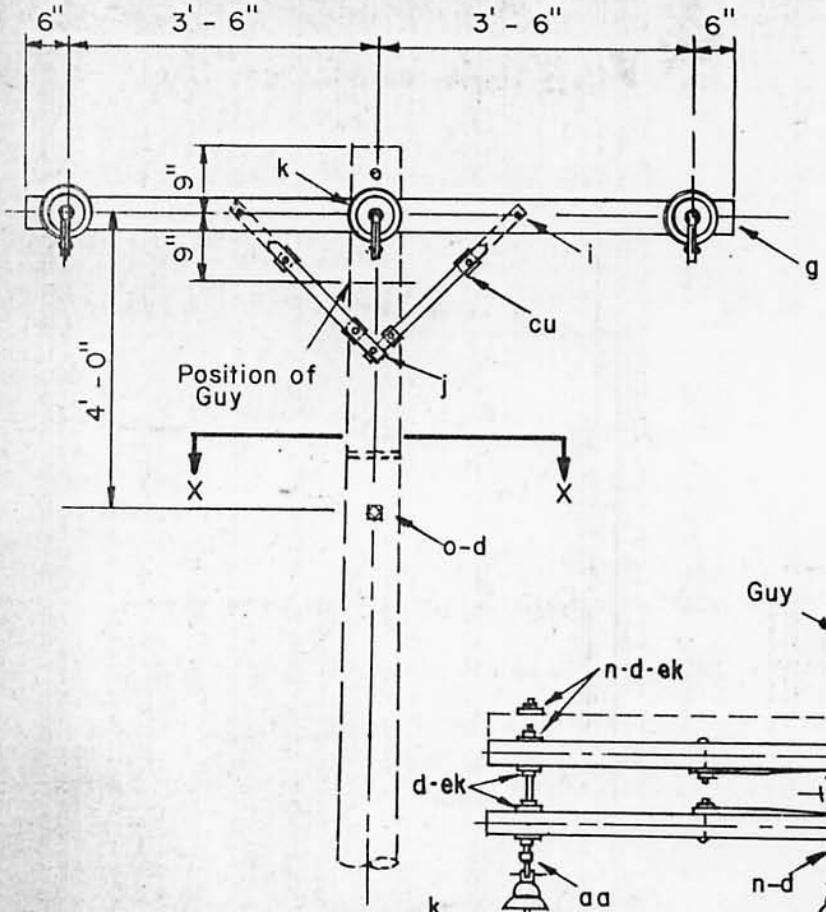
* Conductor Accessories

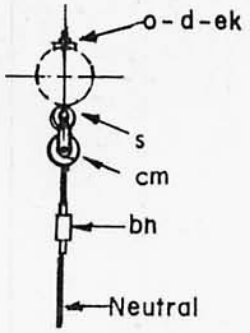
ITEM	NO	MATERIAL
d	4	Washer, $2\frac{1}{4}$" x $2\frac{1}{4}$" x 3/16", 13/16" hole
k	6	Insulator, suspension
l	3	Clamp, deadend
o	4	Bolt, eye, 5/8" x 12"
o	2	Bolt, eye, 5/8" x 18"
s	1	Clevis, secondary, swinging
T	2'	Armor Tape *
aa	2	Nut, eye, 5/8"
bn	2	Clamp, loop, deadend
bo	2	Shackle, anchor
cm	1	Spool Insulator, 3" dia. groove **
ek	4	Locknut 5/8"

7.62/13.2 KV.
3-PHASE, VERTICAL CONSTRUCTION
DEADEND (SINGLE)

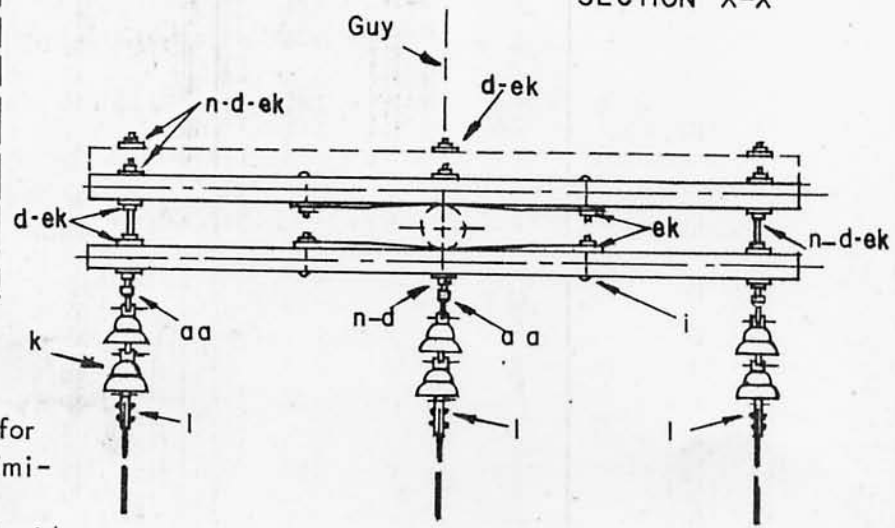
MAY 15, 1973

C5-1





SECTION X-X



PLAN

Notes:

1. See drawing E5-1 for crossarm loading limitation.
2. Designate as C7-1 with 3 crossarms.

** See M42-11

* Conductor Accessories

ITEM	NO	MATERIAL
d	11	Washer, $2\frac{1}{4}$" x $2\frac{1}{4}$" x 3/16", 13/16"hole
g	2	Crossarm, $3\frac{1}{2}$" x $4\frac{1}{2}$" x 8'-0"
i	4	Bolt, carriage, 3/8" x $4\frac{1}{2}$"
j	2	Screw, lag, $\frac{1}{2}$" x 4"
k	6	Insulator, suspension
l	3	Clamp, deadend
n	3	Bolt, double arming, 5/8" x 22"
o	1	Bolt, eye, 5/8" x 12"
s	1	Clevis, secondary, swinging
T	2'	Armor Tape *
aa	3	Nut, eye, 5/8"
bn	2	Clamp, loop, deadend
cu	4	Brace, Wood, 28"
ek	4	Locknut 3/8"
ek	11	Locknut 5/8"

ITEM	NO.	MATERIAL
cm	1	Spool insulator, 3" dia. groove **

NOTES:

#4 ACSR - Designate C7

#2 ACSR - Designate C7-1

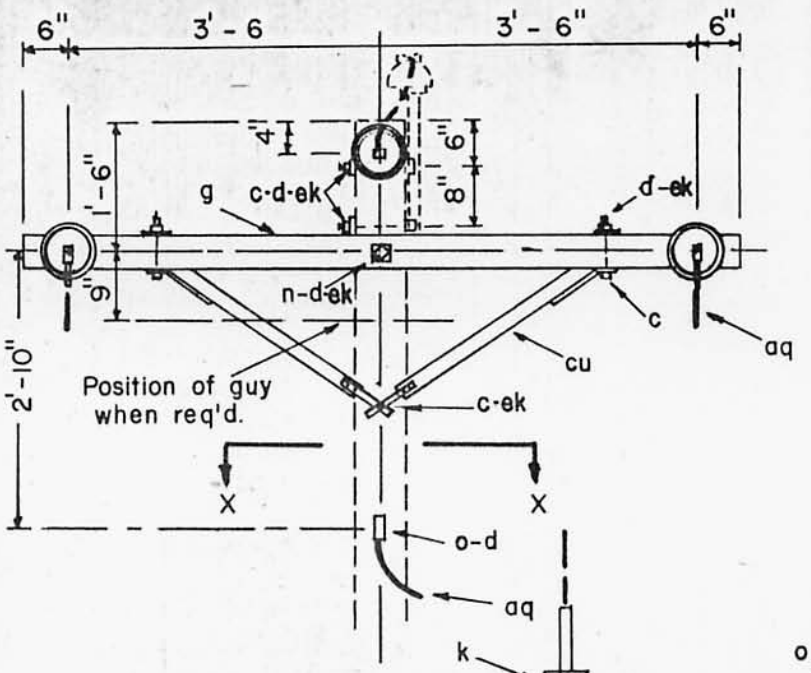
#1/0 ACSR & Larger - Designate C7 and E5-2

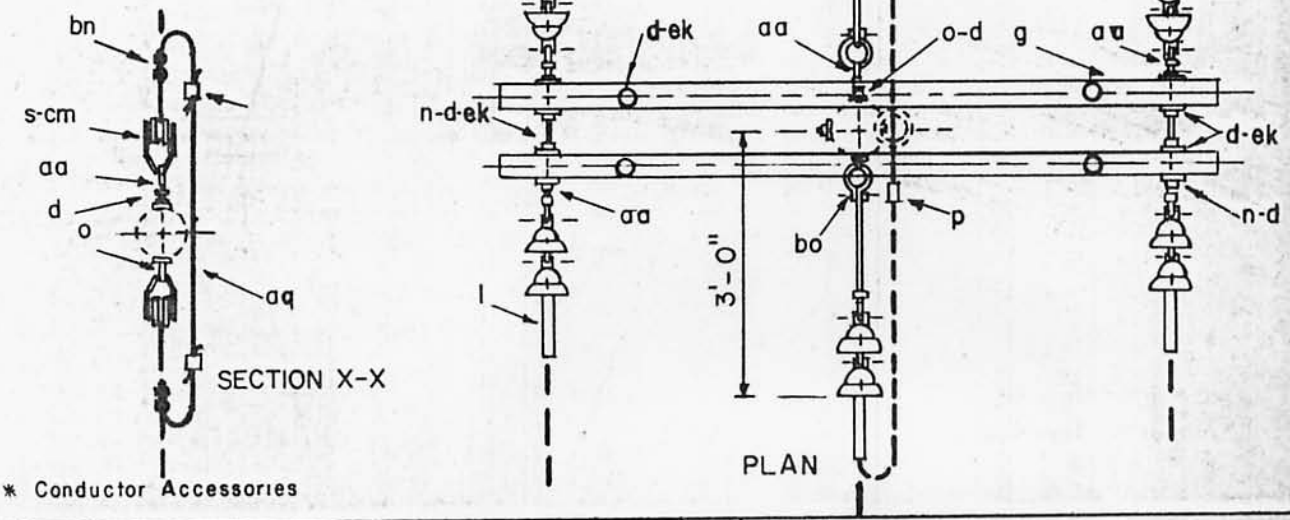
7.62/13.2 KV.
3-PHASE CROSSARM CONSTRUCTION
DEAD END (SINGLE)

May 15, 1973

C7, C7-1

NOTE
1. C8 can be used with M3-12 and M3-12A
2. For through line add M5-1 and M5-2 as required.





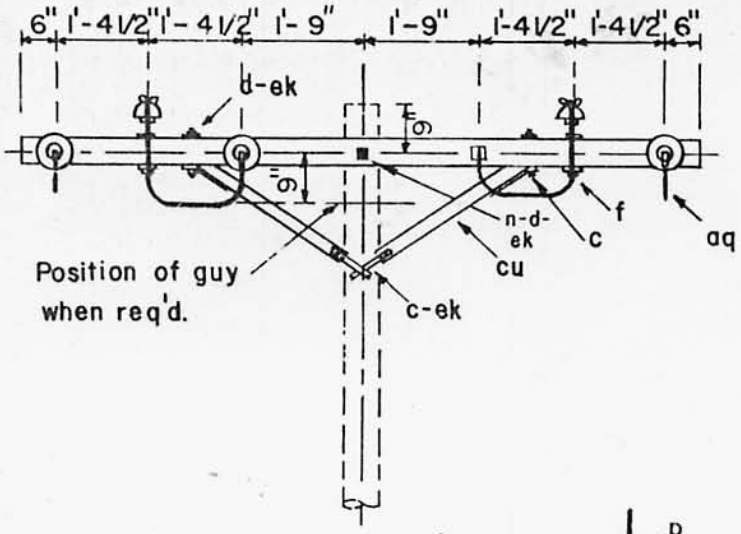
* Conductor Accessories

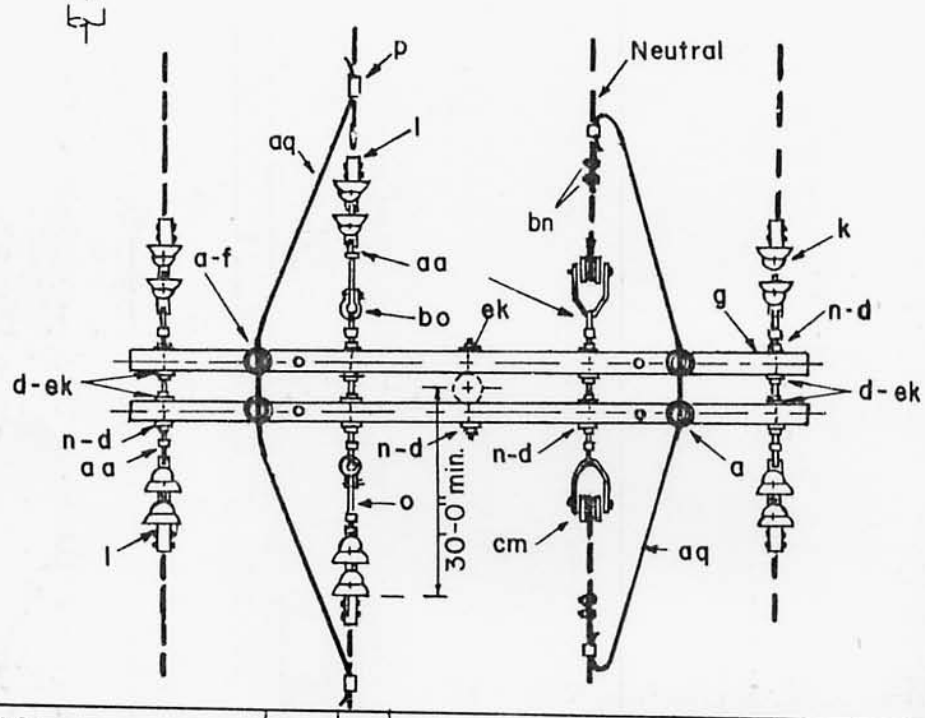
ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
s	2	Clevis, secondary, swinging	o	2	Bolt, eye, 5/8" x 12"
c	1	Bolt machine, 5/8" x 12"	p	5	Connector, compression
c	4	Bolt machine, 1/2" x 6"	aa	8	Nut, eye, 5/8"
d	14	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16" hole	aq		Jumperand leads, as req'd.
d	4	Washer, rd. 1 3/8", 9/16" diam., 9/16" hole	bo	2	Shockle, anchor
cm	2	Spool, Insulator, 3 dia. groove	cu	2	Brace wood, 60" span
g	2	Crossarm, 3 1/2" x 4 1/2 x 8'-0"	ek	12	Lacknut, 5/8"
k	12	Insulator, suspension	bn	4	Clamp, loop deadend
n	3	Bolt, double arming, 5/8" x 24"	o	2	Bolt eye, 5/8" x 18"
l	6	Clamp, deadend			
T	2'	Armor tape *			
ek	4	Locknut 1/2"			

7.62/13.2 KV. 3-PHASE CROSSARM CONSTRUCTION, DEADEND (DOUBLE)

MAY 15, 1973

C8





* Conductor Accessories

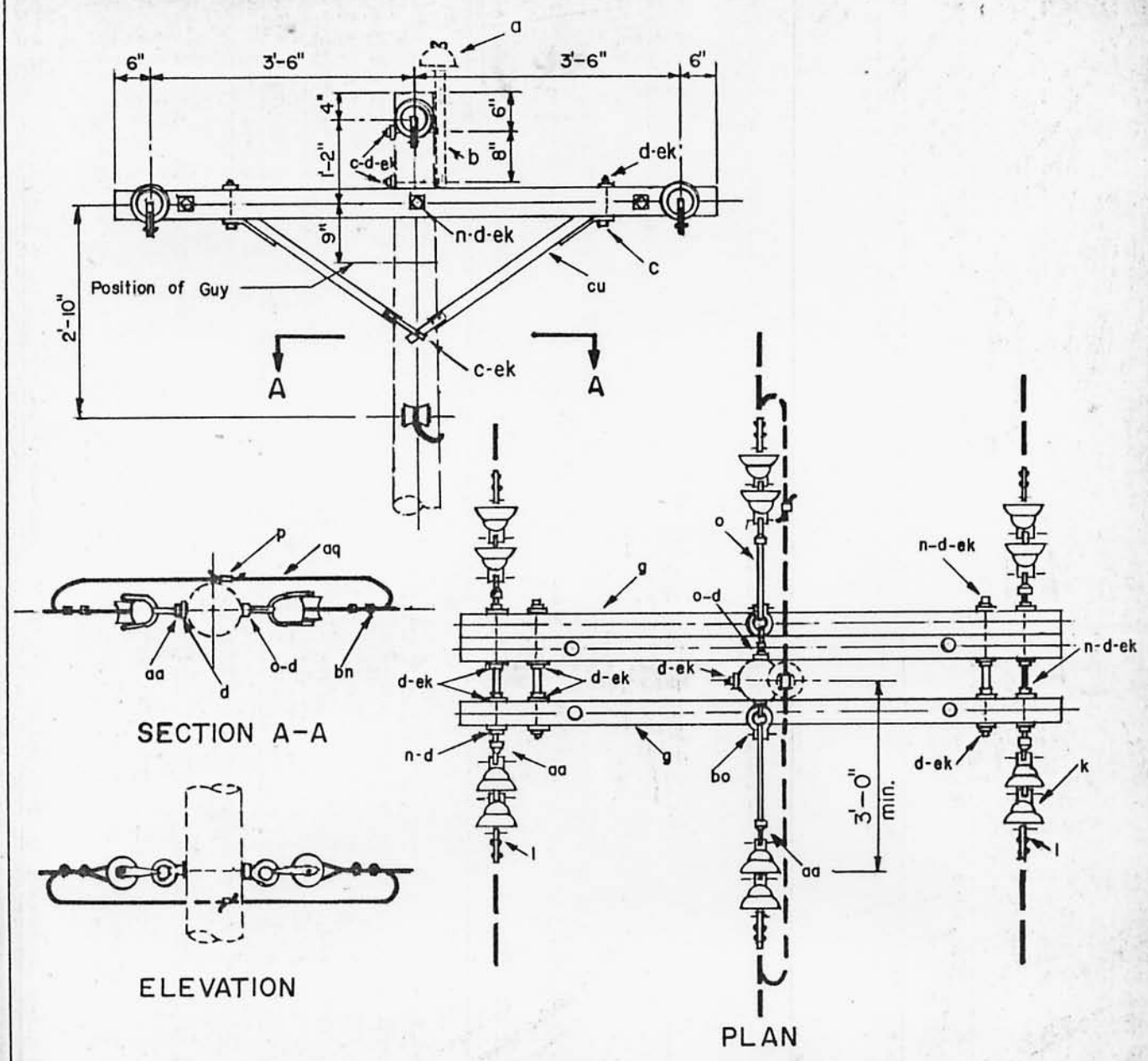
ITEM	NO.	MATERIAL
ek	4	Locknut, 1/2'
g	4	Insulator, pin type
c	1	Bolt, machine, 5/8" x 12"
c	4	Bolt, machine, 1/2" x 6"
d	18	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16" hole
d	4	Washer, round 1 3/8" dia. 3/16" hole
f	4	Pin, crossarm, steel, 5/8" x 10 3/4"
g	2	Crossarm, 3 3/4" x 4 3/4" x 10'-0"
k	12	Insulator, suspension
l	6	Clamp, deadend
cm	2	Spool insulator, 3" dia. groove
bn	4	Clamp, loop deadend

ITEM	NO.	MATERIAL
p	4	Connector, compression
o	2	Bolt eye, 5/8" x 18"
aa	10	Nut, eye, 5/8"
aq		Jumper and leads as required
bo	2	Shackle, anchor
cu	2	Brace wood 60" span
ek	11	Locknut, 5/8"
S	2	Clevis, secondary, swinging
n	5	Bolt double arming, 5/8" x 24"
T	4'	Armor tape *

7.62/13.2 KV. 3-PHASE CROSSARM CONSTRUCTION-DEADEND (DOUBLE)

MAY 15, 1973

C8 - 1



* Conductor Accessories

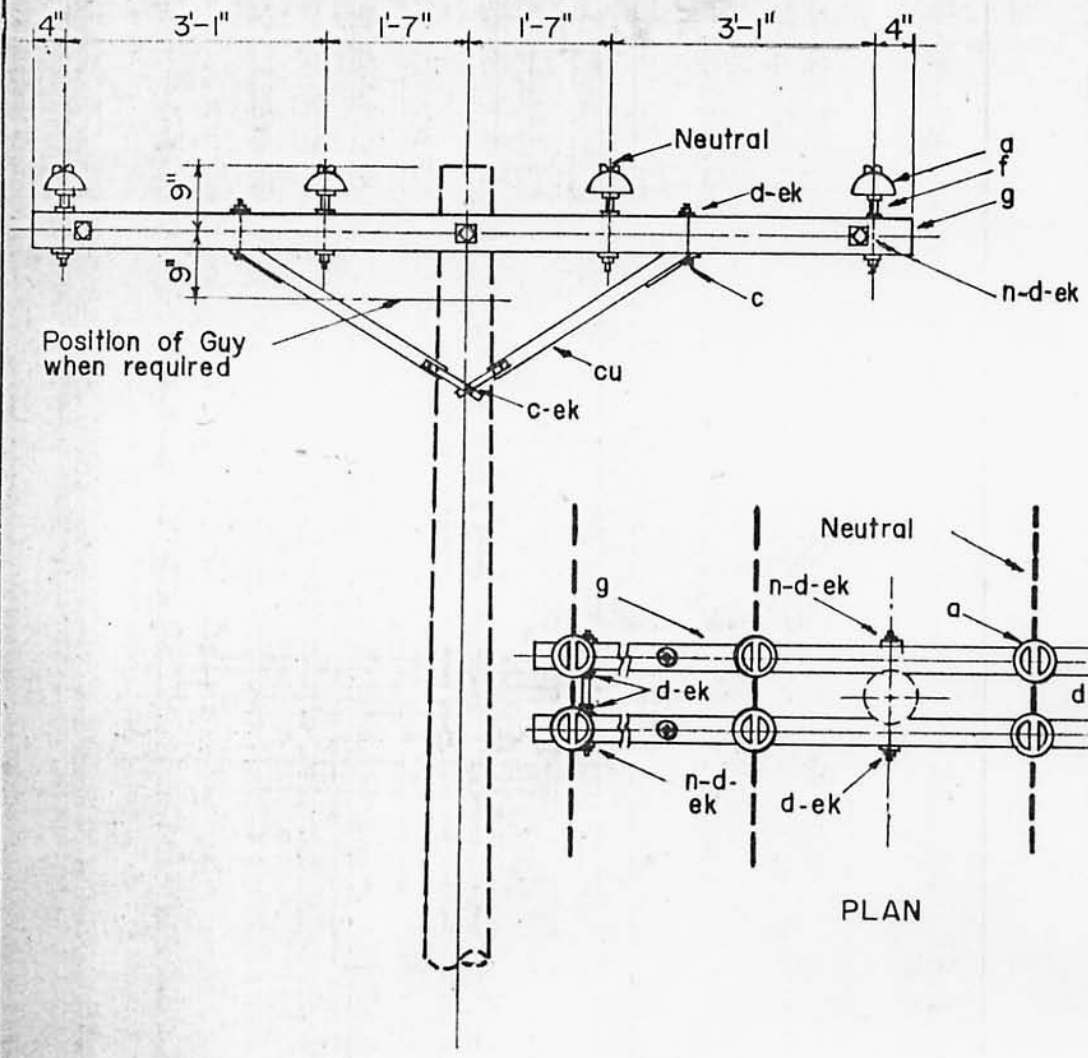
ITEM	NO.	MATERIAL
c	1	Bolt, machine, 5/8"x 12"
c	4	Bolt, machine, 1/2"x 6"
d	22	Washer, 2 1/4"x 2 1/4"x 3/16", 13/16" hole
d	4	Washer, round, 1 3/8"dia., 9/16" hole
g	3	Crossarm, 3 3/4"x 4 3/4"x 8'-0"
k	12	Insulator, suspension
n	5	Bolt, double arming, 5/8"x 26"
o	2	Bolt, eye, 5/8"x 12"
o	2	Bolt, eye, 5/8"x 18"
p	4	Connectors, compression
l	6	Clamp, dead end
s	2	Clevis, secondary, swinging
t	4'	Armor tape *
aa	8	Nut, eye, 5/8"

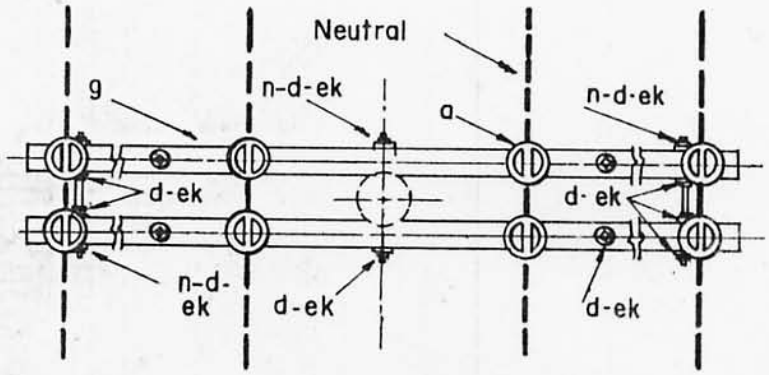
ITEM	NO.	MATERIAL
aq		Jumpers, as required
bn	4	Clamp, loop, deadend
bo	2	Shackle, anchor
cm	2	Spool insulator, 3" dia. groove
cu	2	Brace, wood, 60" span
ek	4	Locknut, 1/2"
ek	14	Locknut, 5/8"

7.62/13.2 KV 3-PHASE
CROSSARM CONSTRUCTION DEADEND (DOUBLE)
LARGE CONDUCTORS WITH UNBALANCED LOADS

MAY 15, 1973

C8-3





PLAN

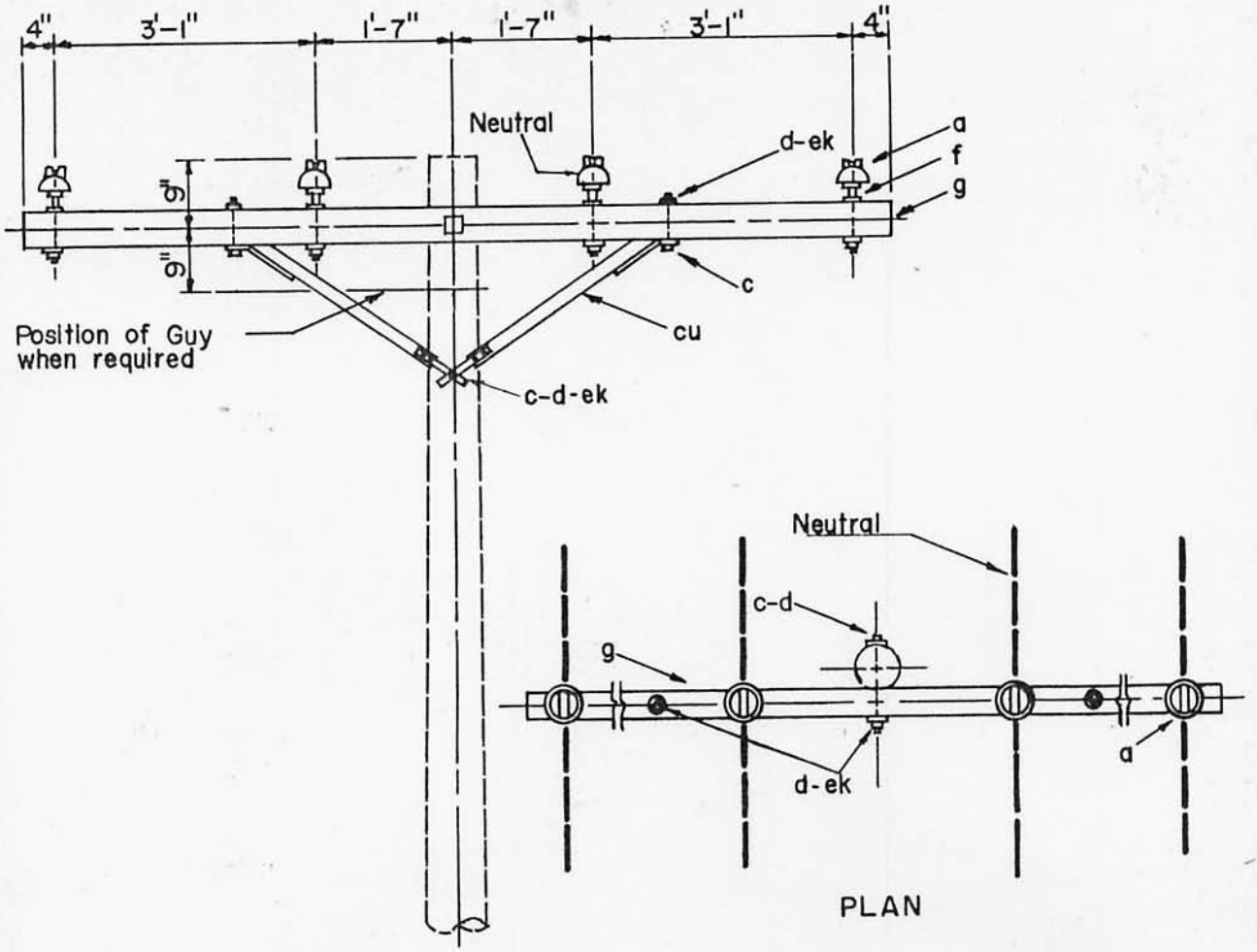
* Conductor Accessories

ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
a	8	Insulator, pin type	n	3	Bolt, double arming, 5/8" x 20"
c	1	Bolt, machine, 5/8" x 12"	bv-2	4	Armor rod (double support)*
c	4	Bolt, machine, 1/2" x 6"	cu	2	Brace, wood, 60" span
d	10	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16" hole	ek	4	Locknut, 1/2"
d	4	Washer, round, 1 3/8" dia., 9/16" hole	ek	11	Locknut, 5/8"
f	8	Pin, crossarm, steel, 5/8" x 10 3/4"	Tw	64'	Tie wire *
g	2	Crossarm, 3 3/4" x 4 3/4" x 10'-0"			

7.62/13.2 KV. 3-PHASE
CROSSARM CONSTRUCTION-DOUBLE LINE ARM

MAY 15, 1973

C9



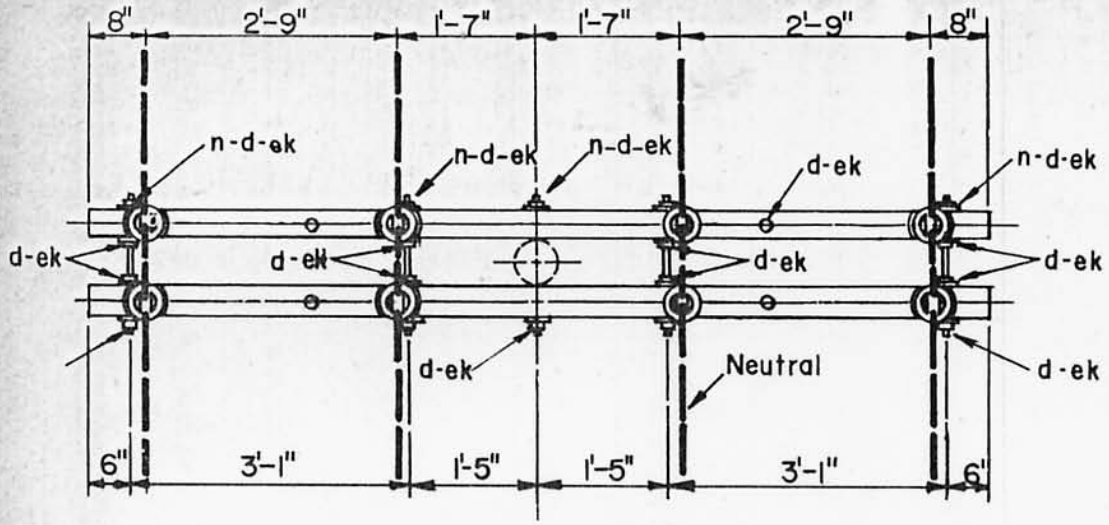
* Conductor Accessories

ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
a	4	Insulator, pin type	bv-1	4	Armor rod (single support) *
c	1	Bolt, machine, 5/8" x 12"	cu	1	Brace, wood, 60" span
c	2	Bolt, machine, 1/2" x 6"	ek	2	Locknut, 1/2"
c	1	Bolt, machine, 5/8" x 16"	ek	2	Locknut, 5/8"
d	3	Washer, 2 1/4" x 2 1/4" x 3/16" x 13/16" hole	Tw	32'	Tie wire *
d	2	Washer, round, 1 3/8" dia., 9/16" hole			
f	4	Pin, crossarm, steel, 5/8" x 10 3/4"			
g	1	Crossarm, 3 3/4" x 4 3/4" x 10'-0"			

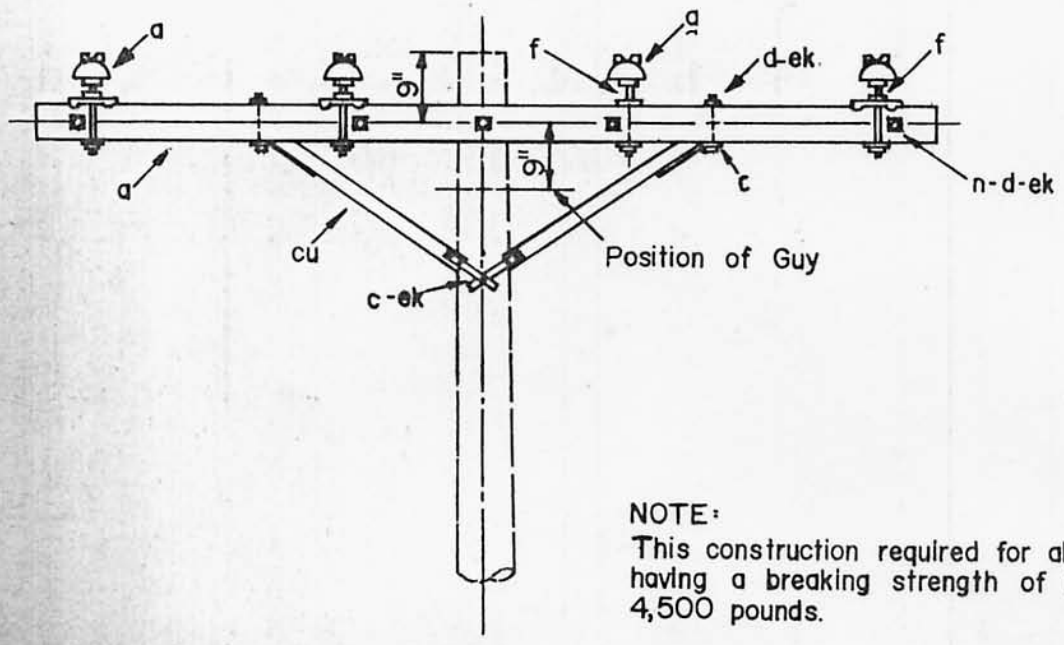
7.62/13.2 KV.
3-PHASE CROSSARM CONSTRUCTION
SINGLE LINE ARM

MAY 15, 1973

C9-1



PLAN



NOTE:
This construction required for all conductors having a breaking strength of more than 4,500 pounds.

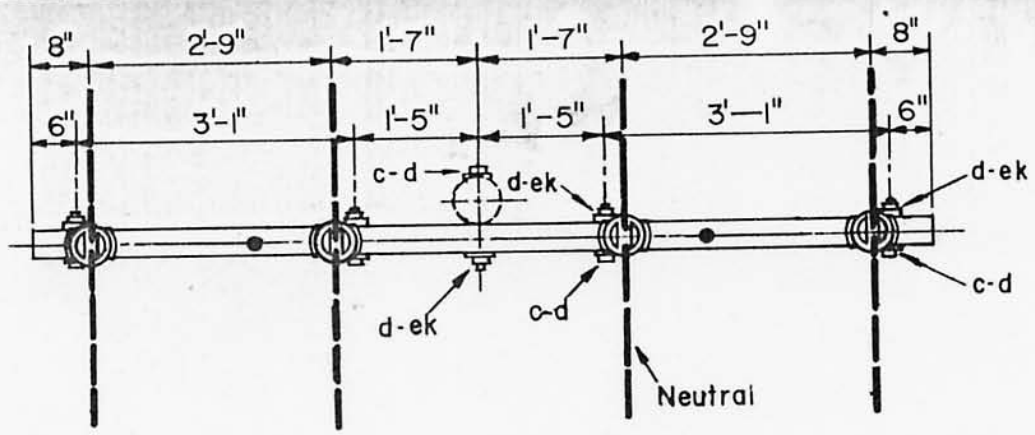
* Conductor Accessories

ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
a	8	Insulator, pin type	g	2	Crossarm, 3 3/4" x 4 3/4" x 10'-0"
c	1	Bolt, machine, 5/8" x 12"	bv-2	4	Armor rod (double support)*
c	4	Bolt, machine, 1/2" x 6"	cu	2	Brace; wood, 60" span
d	18	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16" hole	ek	4	Locknut, 1/2"
d	4	Washer, round 1 3/8" dia., 9/16" hole	ek	19	Locknut, 5/8"
f	8	Pin, crossarm, steel, clamp type	Tw	64'	Tie wire*
n	5	Bolt, double arming, 5/8" x 22"			

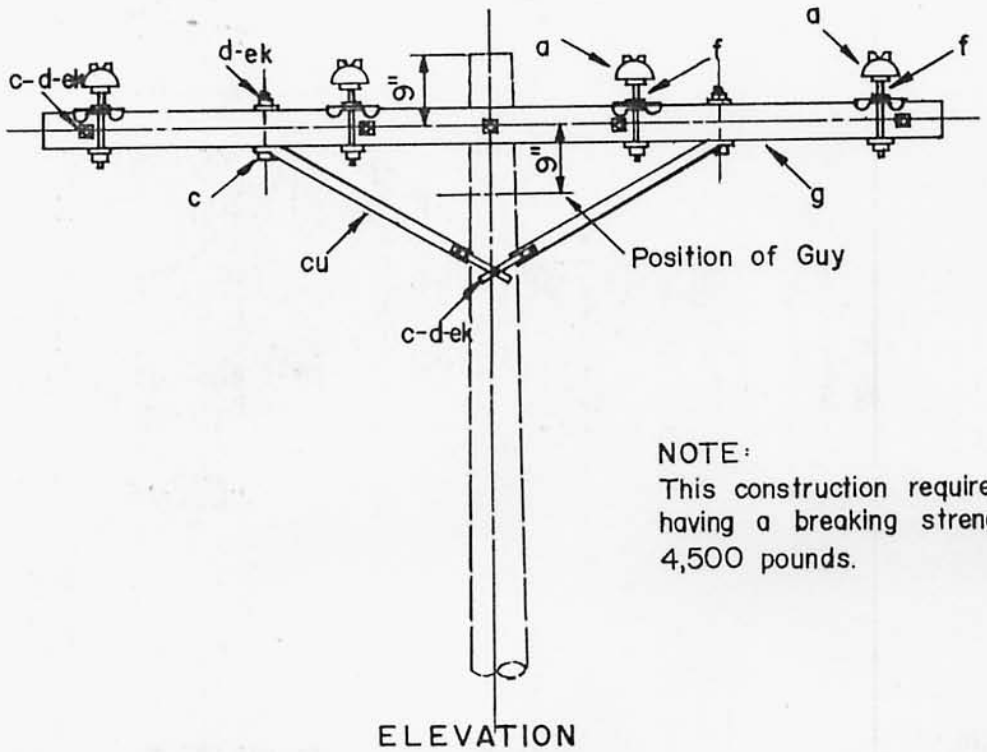
7.62/13.2 KV. 3-PHASE
CROSSARM CONSTRUCTION - DOUBLE LINE ARM
0° TO 5° ANGLE (LARGE CONDUCTORS)

MAY 15, 1973

C9-2



PLAN



ELEVATION

NOTE:
This construction required for all conductors having a breaking strength of more than 4,500 pounds.

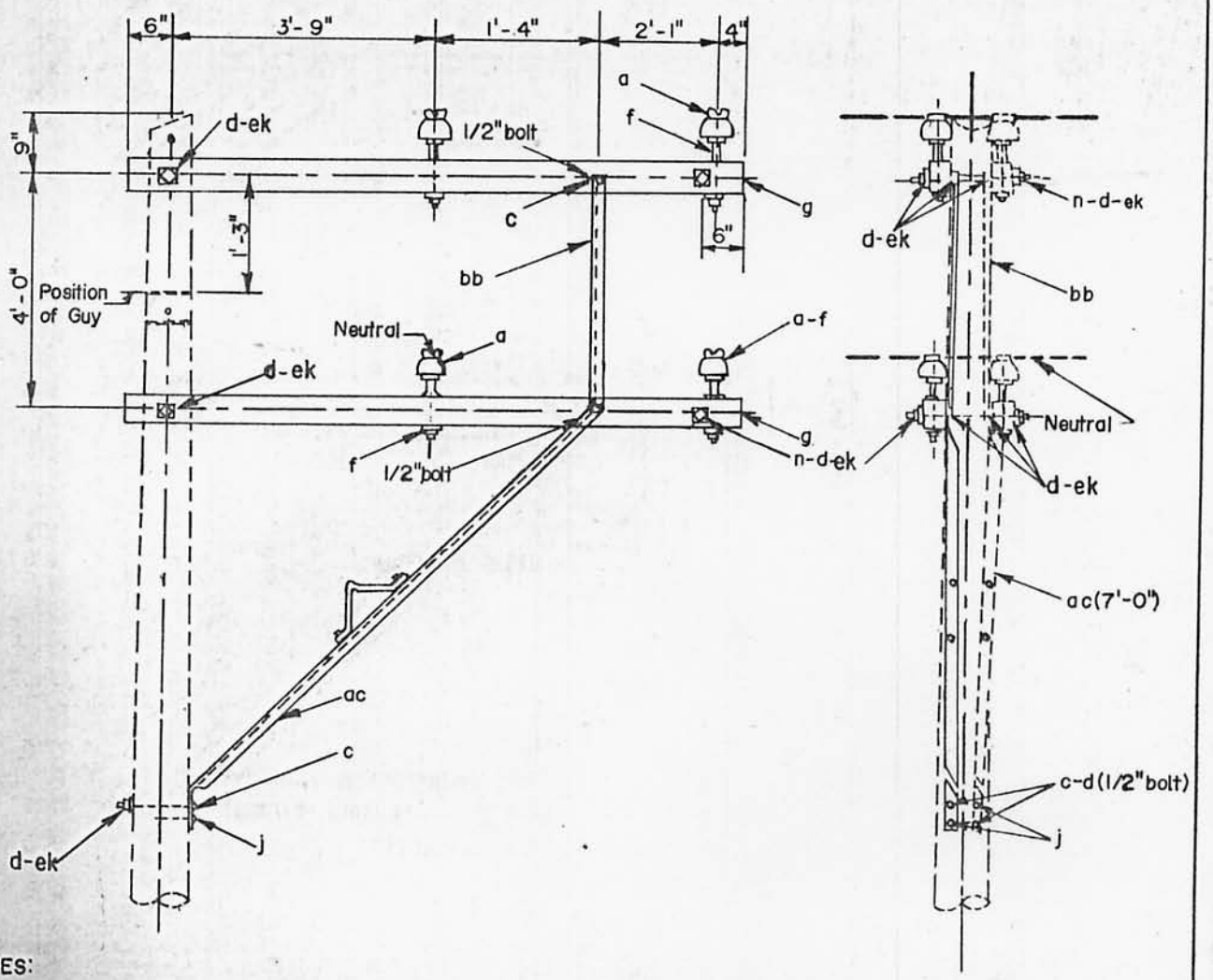
* Conductor Accessories

ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
a	4	Insulator, pin type	ek'	2	Locknut, 1/2"
c	4	Bolt, machine, 5/8"x 5"	ek	6	Locknut, 5/8"
c	2	Bolt, machine, 1/2" x 6"	Tw	32'	Tie wire *
c	1	Bolt, machine, 5/8" x 12"			
c	1	Bolt, machine, 5/8" x 16"			
d	11	Washer, 2 1/4"x 2 1/4"x 3/16", 13/16"hole			
d	2	Washer, round, 1 3/8"dia., 9/16" hole			
f	4	Pin, crossarm, steel, clamp type			
g	1	Crossarm, 3 3/4"x 4 3/4"x 10'-0"			
bv-1	4	Armor rod (single support) *			
cu	1	Brace, wood, 60" span			

7.62/13.2 KV. 3-PHASE
CROSSARM CONSTRUCTION - SINGLE LINE ARM
(LARGE CONDUCTORS)

MAY 15, 1973

C9-3



NOTES:

1. Add Ground Assembly As Required.
2. Where these assemblies are required, spans shall be shortened, as at crossings.
3. Neutral position may be changed in the field as directed by the Engineers.

ITEM	NO. REQ'D. C14	NO. REQ'D. C15	MATERIAL
a	4	8	Insulator, pin type
c	2	0	Bolt, machine, 5/8" x 16"
c	2	4	Bolt, machine, 1/2" x 6"
c	1	2	Bolt, machine, 1/2" x 10"(12" C15)
d	4	12	Washer, 2-1/4" x 2-1/4" x 3/16", 13/16" hole.
d	3	6	Washer, round, 1-3/8" diam., 9/16" hole.
f	4	8	Pin, crossarm, steel, 5/8" x 10-3/4"
bv-2		4	Armor Rod(Double Support) *
TW	32'	64'	Tie Wires *
bv-1	4		Armor Rod(Single) *

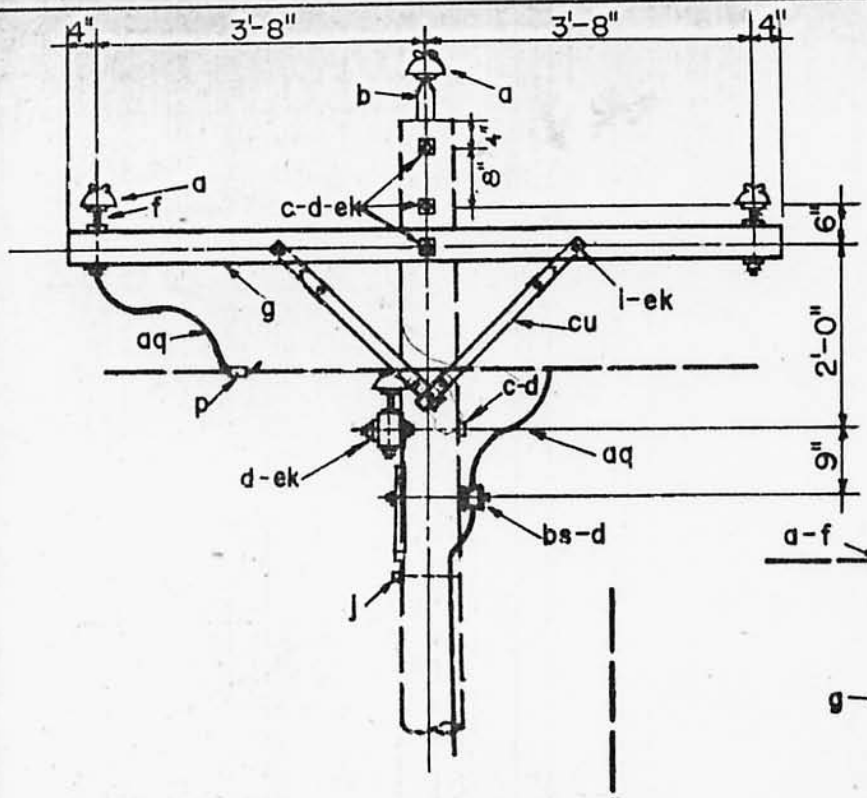
ITEM	NO. REQ'D C14	NO. REQ'D C15	MATERIAL
g	2	4	Crossarm, 3-1/2" x 4-1/2 x 8'-0"
j	1	2	Screw, lag, 1/2" x 4"
n	0	4	Bolt, double arming, 5/8" x 22"
ac	1	2	Brace, sidearm diagonal, 1-3/4" angle, 3/16" x 7'
bb	1	2	Brace, sidearm vertical, angle, 50"
ek	2	12	Locknuts, 5/8"
ek	3	6	Locknuts, 1/2"

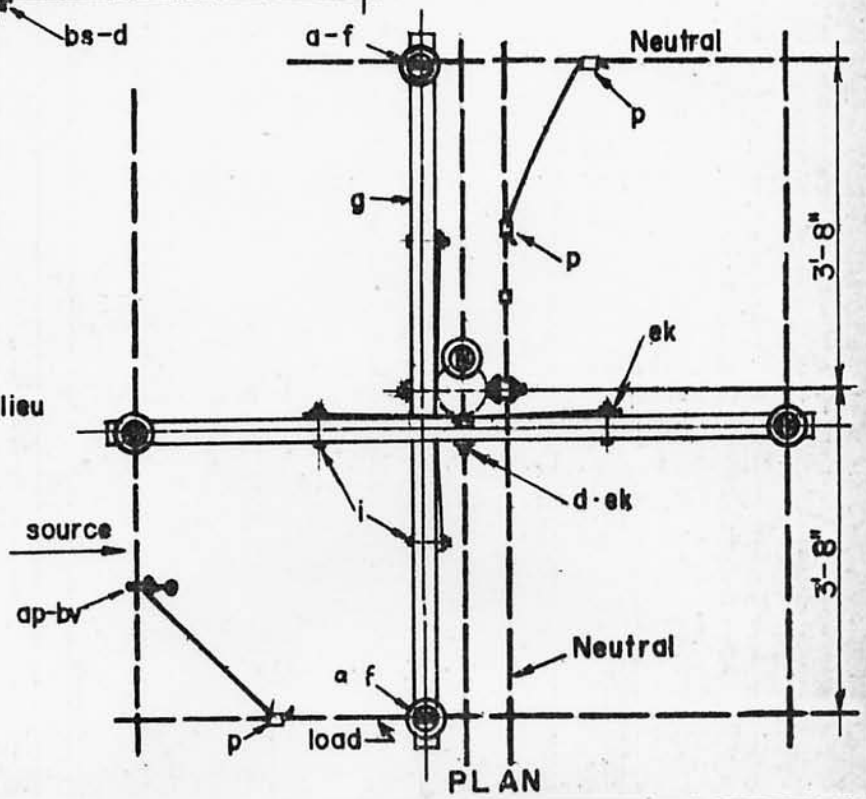
* - Conductor Accessories

7.62/13.2 KV.
THREE-PHASE, SIDEARM CONSTRUCTION
(FOR SINGLE, DOUBLE PRIMARY SUPPORTS)

MAY 15, 1973

C 14, C 15





PLAN

NOTE:

Tap Saddle may be used in lieu of Tapping Armor Rod.

* Conductor Accessories

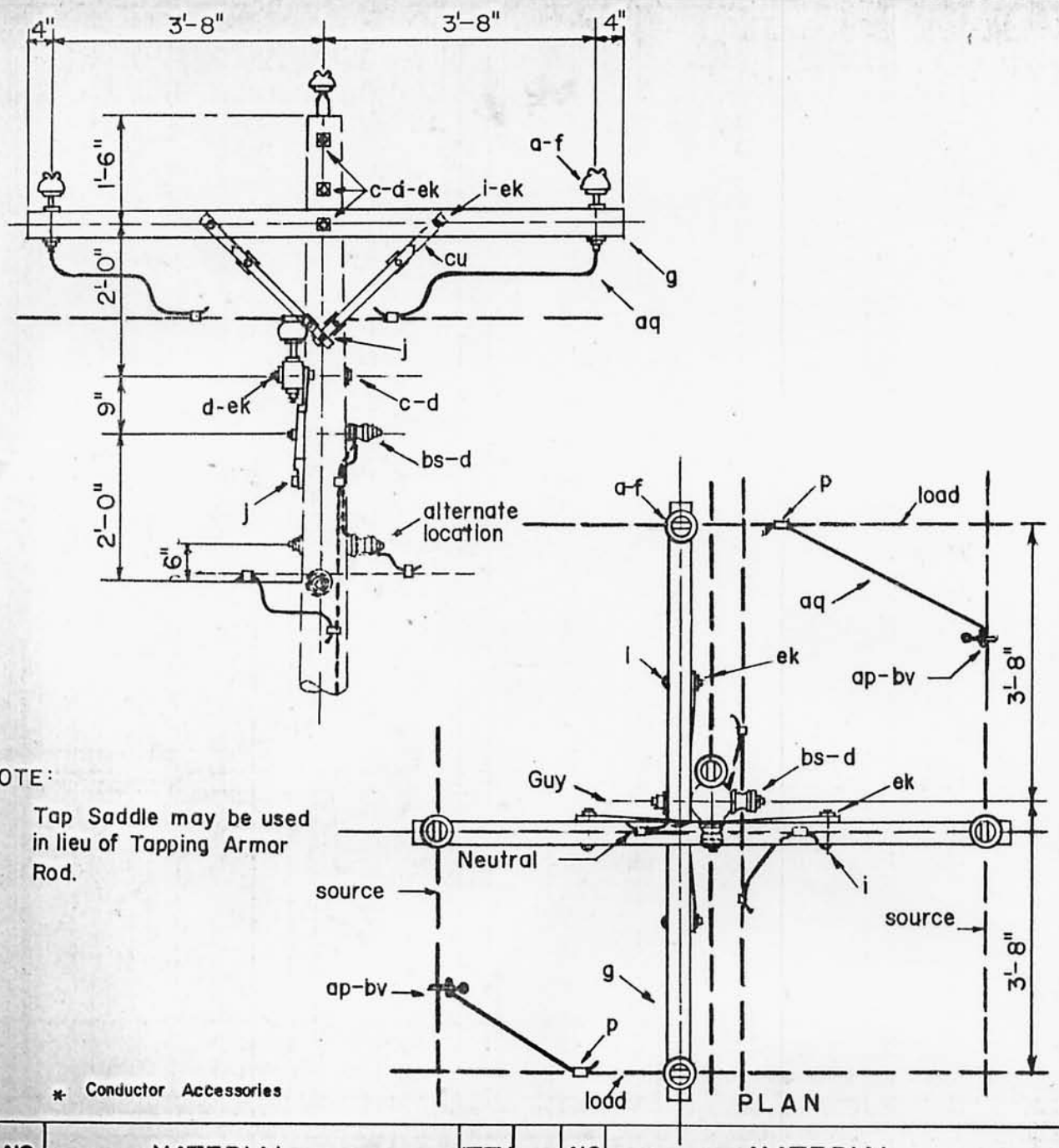
ITEM	NO.	MATERIAL
a	5	Insulator, pin type
b	1	Pin, pole top, 20"
c	2	Bolt, machine, 5/8"x 12"
c	2	Bolt, machine, 5/8" x 16"
d	7	Washer; 2 1/4" x 2 1/4"x 3/16", 13/16" hole
f	4	Pin, crossarm, steel, 5/8"x 10 1/4"
g	2	Crossarm, 3 1/2"x 4 1/2" x 8'-0"
i	4	Bolt, carriage, 3/8"x 4 1/2"
j	2	Screw, lag, 1/2"x 4"
p	3	Connector, compression
ap	1	Hot line clamp
aq		Jumper & lead as required
bs	1	Bolt, single upset, 5/8"x 12"
bv	1	Armor rod (tapping) *
bv-1	6	Armor rod (single support) *
cu	4	Brace, wood, 28"

ITEM	NO.	MATERIAL
cm	1	Spool insulator, 1 3/4" dia. groove
ek	4	Locknut, 5/8"
ek	4	Locknut, 3/8"
Tw	48'	Tie wire *

7.62/13.2 KV.
3-PHASE, CROSSARM CONSTRUCTION
SINGLE-PHASE JUNCTION AT 0° TO 5° ANGLE

MAY 15, 1973

C22X



NOTE:

Tap Saddle may be used in lieu of Tapping Armor Rod.

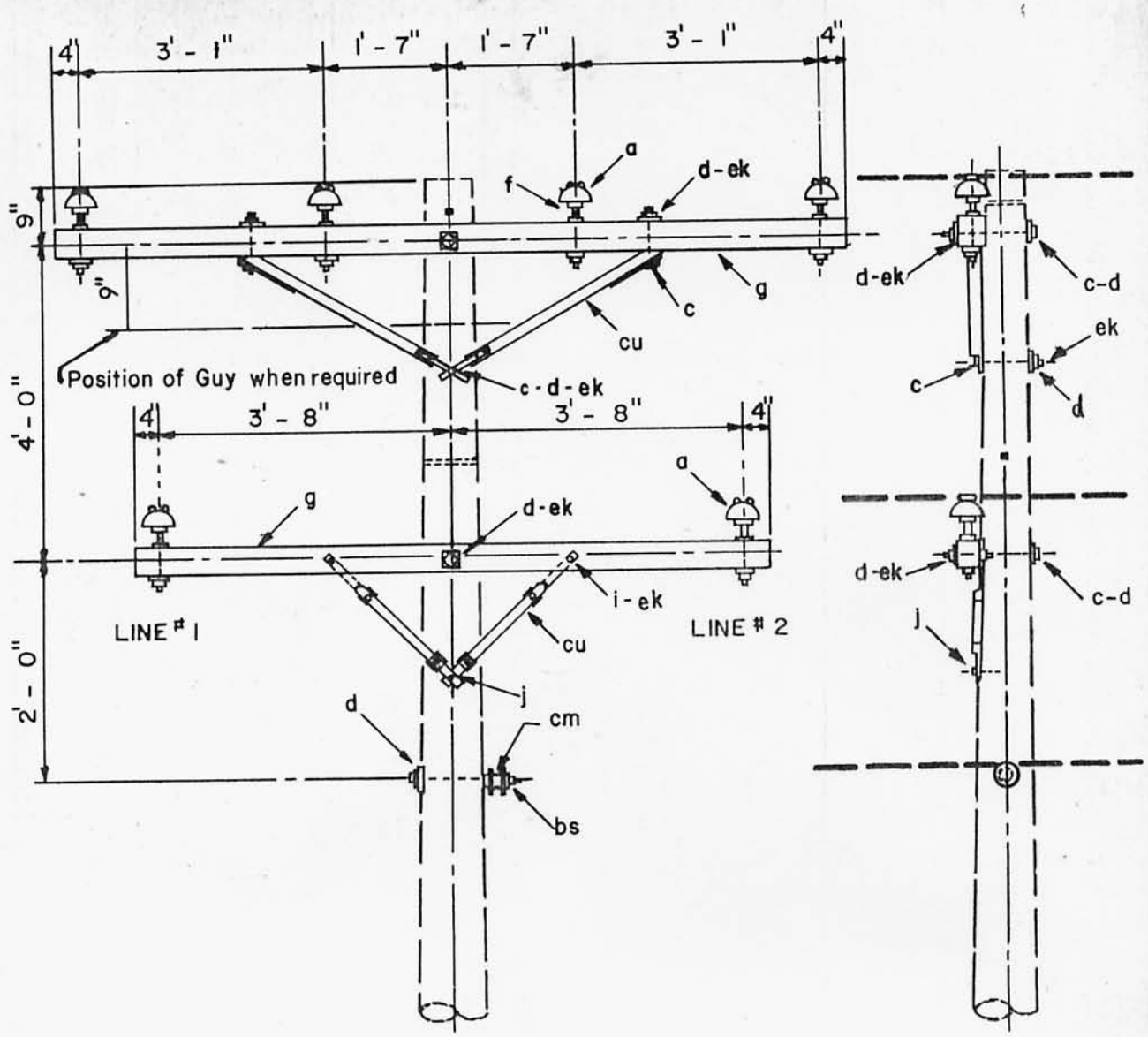
* Conductor Accessories

ITEM	NO.	MATERIAL	ITEM		NO.	MATERIAL
a	5	Insulator, pin type		ek	4	Locknut, 5/8"
b	1	Pin, pole top, 20"		ek	4	Locknut, 3/8"
c	2	Bolt, machine, 5/8"x12"		Tw	56'	Tie wire *
c	2	Bolt, machine, 5/8 "x 16"				
d	8	Washer, 2 1/4"x 2 1/4"x 3/16", 13/16" hole				
f	4	Pin, crossarm, steel, 5/8"x 10 3/4"				
g	2	Crossarm, 3 1/2"x 4 1/2"x 8'-0"				
i	4	Bolt, carriage, 3/8"x 4 1/2"				
j	2	Screw, lag, 1/2"x 4"				
p	6	Connector, compression				
aq		Jumper, req'd length				
ap	2	Hot line clamp				
bs	2	Bolt, single upset, 5/8"x 12"				
bv	2	Armor rod (tapping) *				
bv-1	7	Armor rod (single support) *				
cm	2	Spool insulator, 1 3/4" dia. groove				
cu	4	Brace, wood, 28"				

7.62/13.2 KV., 3-PHASE, CROSSARM CONSTRUCTION TWO PHASE JUNCTION AT 0° TO 5° ANGLE

MAY 15, 1973

C24

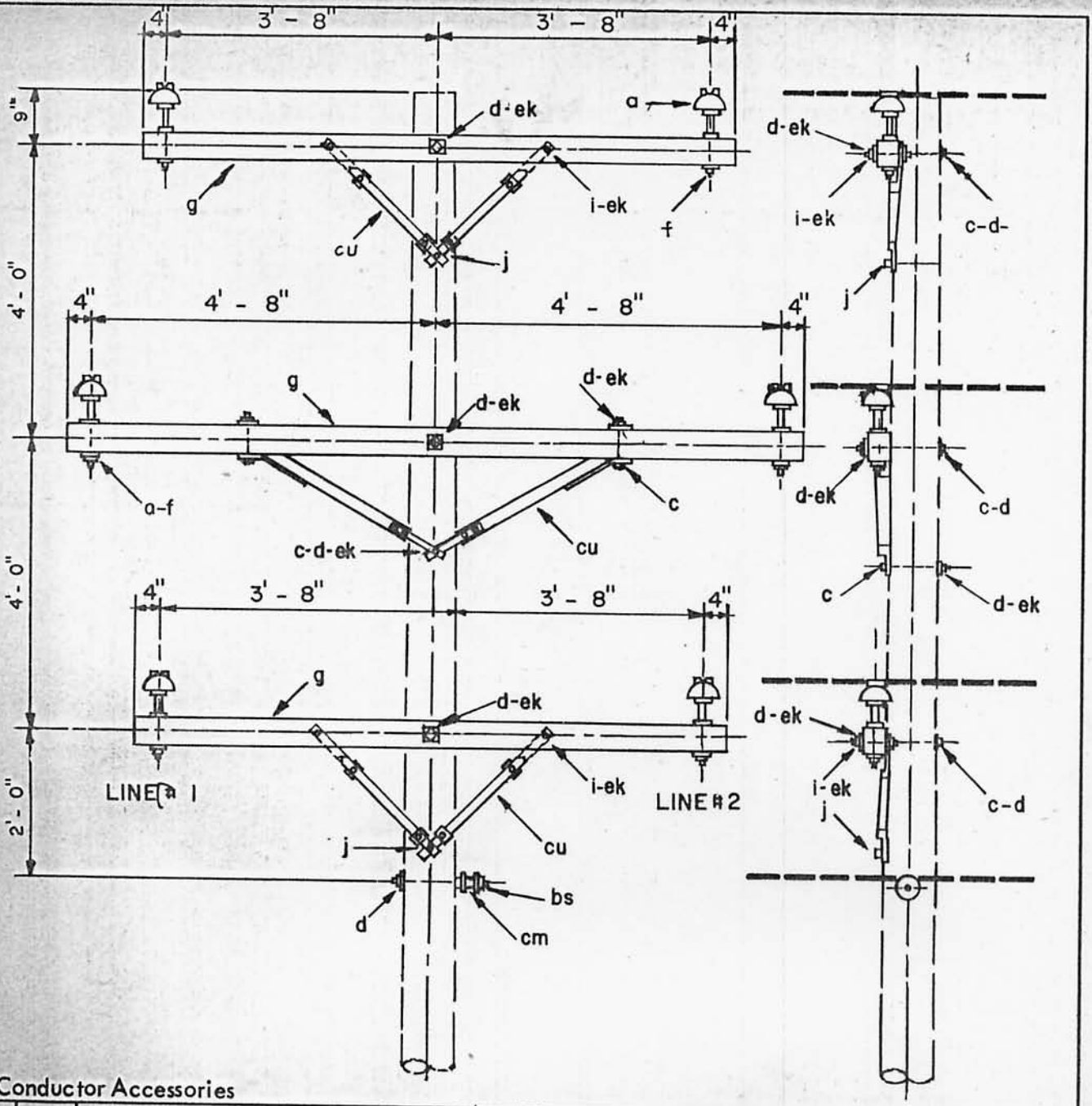


* Conductor Accessories

ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
a	6	Insulator, pin type	cm	1	Spool, Insulator, 1-3/4" dia., Groove
c	1	Bolt, machine, 5/8" x 12"	cu	2	Brace, wood, 28"
c	2	Bolt, machine, 1/2" x 6"	cu	1	Brace, wood 60" span
c	2	Bolt, machine, 5/8" x 16"	ek	2	Locknut $\frac{1}{2}$"
d	6	Washer, $2\frac{1}{4}$" x $2\frac{1}{4}$" x 3/16", 13/16" hole	ek	2	Locknut 3/8"
d	2	Washer, rd., 1-3/8" diam., 19/16" hole	ek	3	Locknut 5/8"
			Tw	56'	Tie Wire
f	6	Pin, crossarm, steel, 5/8" x 10-3/4"			
g	1	Crossarm, 3-3/4" x 4-3/4" x 10'-0"			
g	1	Crossarm, $3\frac{1}{2}$" x $4\frac{1}{2}$" x 8'-0"			
i	2	Bolt, carriage, 3/8" x $4\frac{1}{2}$"			
j	1	Screw, lag, $\frac{1}{2}$" x 4"			
bv-1	7	Armor Rod (Single Support) *			
bs	1	Bolt, single upset, 5/8" x 12"			

7.62/13.2 KV., 3-PHASE
CROSSARM CONSTRUCTION - DOUBLE CIRCUIT
SINGLE PRIMARY SUPPORT AT 0° TO 5° ANGLE

MAY 15, 1973 | 2 X - ARM TYPE | DC-C1



* Conductor Accessories

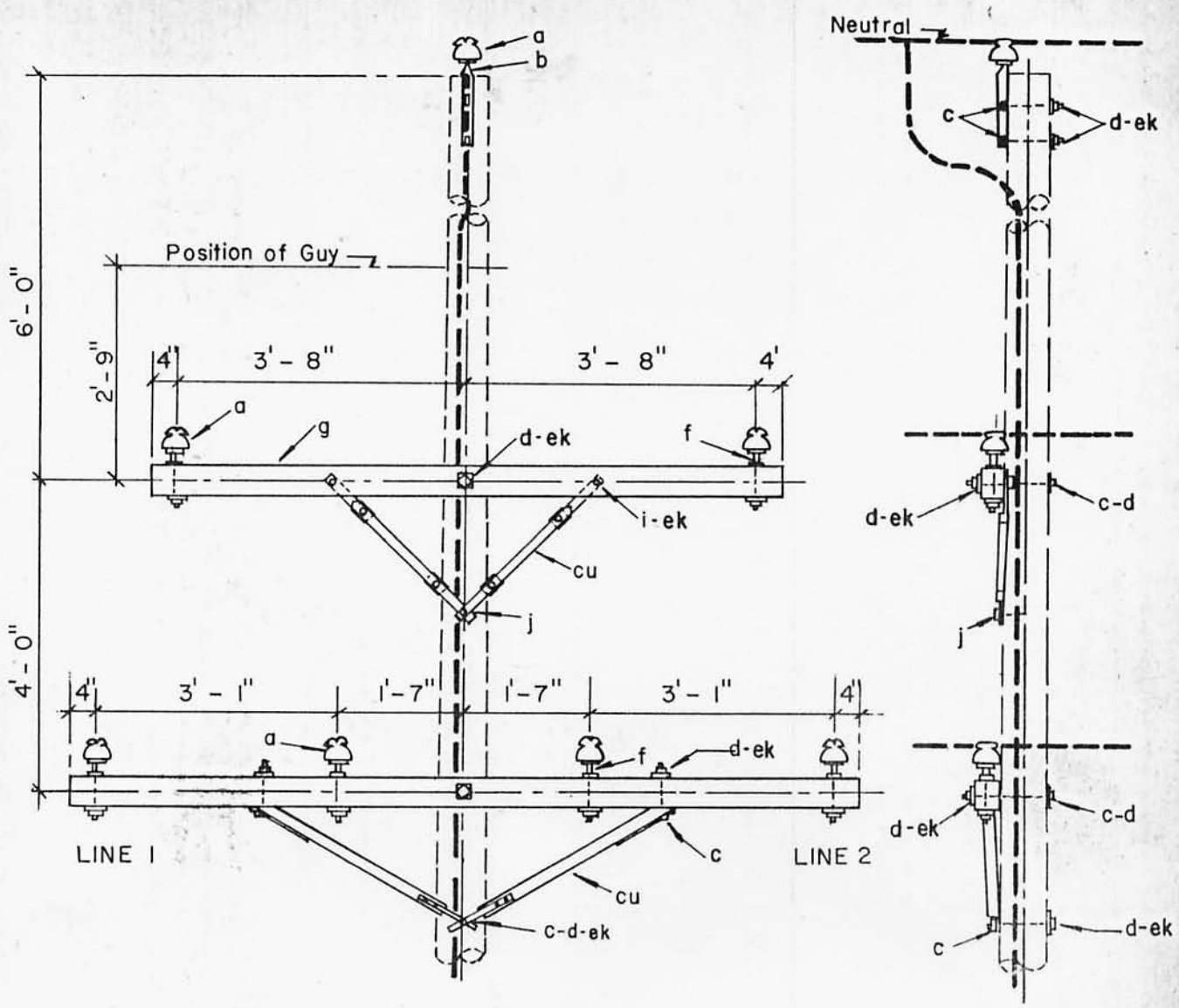
ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
a	6	Insulator, pin type	bv-1	7	Armor Rod (Single Support) *
c	1	Bolt, machine, 5/8" x 12"	bs	1	Bolt, single upset, 5/8" x 14"
c	2	Bolt, machine, 1/2" x 6"	cm	1	Spool, Insulator, 1-3/4" dia., Groove
c	3	Bolt, machine, 5/8" x 16"	cu	4	Brace, wood, 28"
d	8	Washer, 2¼" x 2¼" x 3/16", 13/16" hole.	cu	1	Brace, wood, 60" span
			ek	2	Locknut ½"
d	2	Washer, rd., 1-3/8" diam., 19/16" hole	ek	4	Locknut 3/8"
			ek	4	Locknut 5/8"
f	6	Pin, crossarm, steel, 5/8" x 10-3/4"	Tw	56'	Tie Wire *
g	1	Crossarm, 3-3/4" x 4-3/4" x 10'-0"			
g	2	Crossarm, 3½" x 4½" x 8'-0"			
i	4	Bolt, carriage, 3/8" x 4½"			
j	2	Screw, lag, ½" x 4"			

7.62/13.2 KV. 3-PHASE
CROSSARM CONSTRUCTION-DOUBLE CIRCUIT
SINGLE PRIMARY SUPPORT AT 0° TO 5° ANGLE

MAY 15, 1973

3 X - ARM TYPE

DC-CIA



* Conductor Accessories

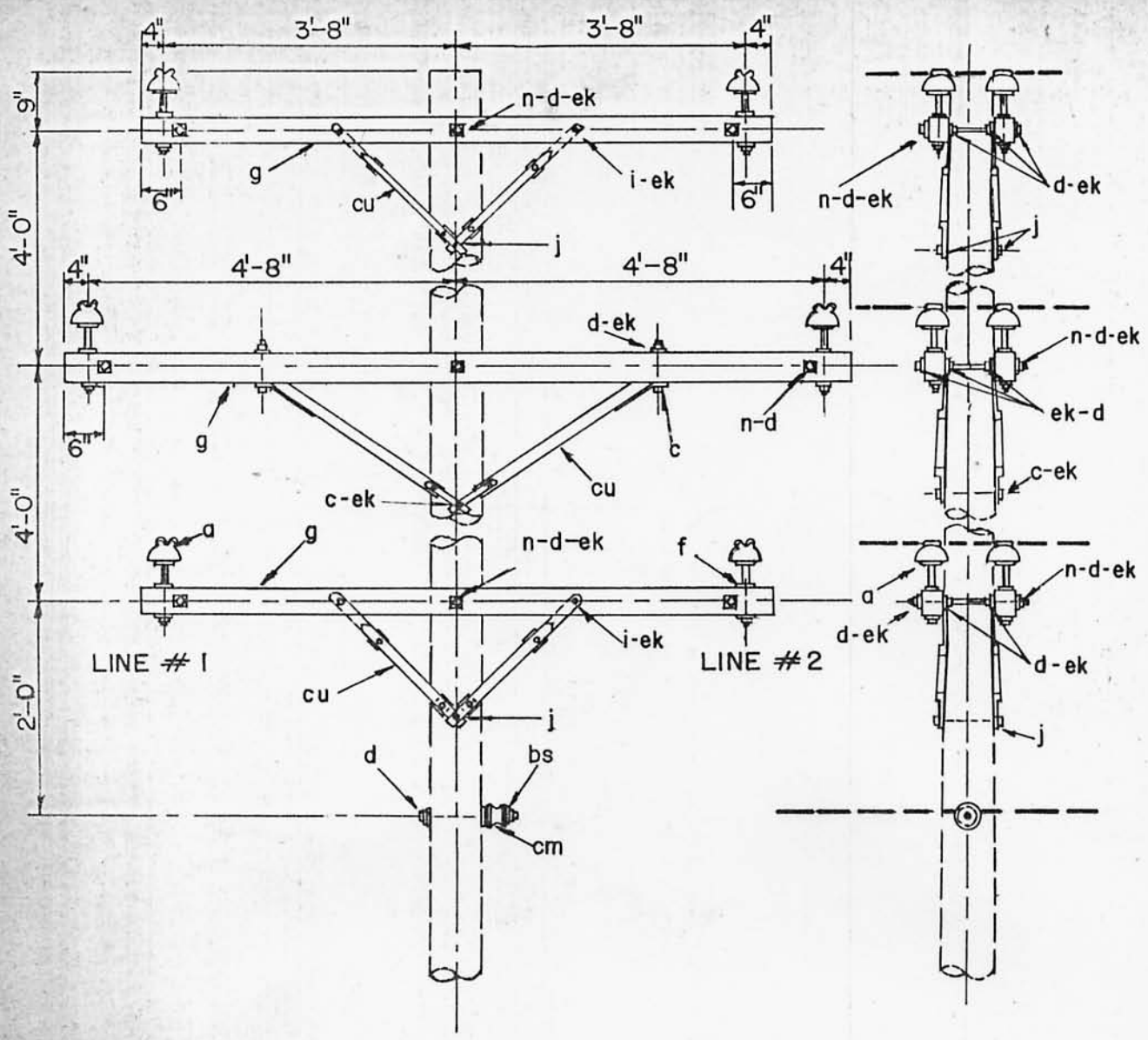
ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
a	7	Insulator pin type	g	1	Crossarm, 3 3/4" x 4 3/4" x 10'-0"
b	1	Pin pole top	g	1	Crossarm, 3 1/2 x 4 1/2 x 8'-0"
c	2	Bolt machine, 5/8" x 12"	i	2	Bolt carriage, 3/8" x 4 1/2"
c	2	Bolt machine, 1/2" x 6"	j	1	Srew lag, 1/2" x 4"
c	1	Bolt machine, 5/8" x 14"	cu	2	Brace wood, 28"
c	2	Bolt machine, 5/8" x 18"	cu	1	Brace wood, 60" span
d	7	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16" hole	ek	5	Locknut, 5/8"
d	2	Washer, round, 1 3/8" dia. 9/16" hole	ek	2	Locknut, 5/8"
ek	2	Locknut, 1/2"			
bv-1	7	Armor rod (Single Support) *			
Tw	56'	Tie wire *			
f	6	Pin, crossarm, steel, 5/8" x 10 3/4"			

7.62/13.2 KV. 3-PHASE, CROSSARM CONSTR'N DOUBLE CIRCUIT - SINGLE PRIMARY SUPPORT WITH OVERHEAD NEUTRAL AT 0° TO 5° ANGLE

2X - ARM TYPE

MAY 15 1973

DC-CIB



* Conductor Accessories

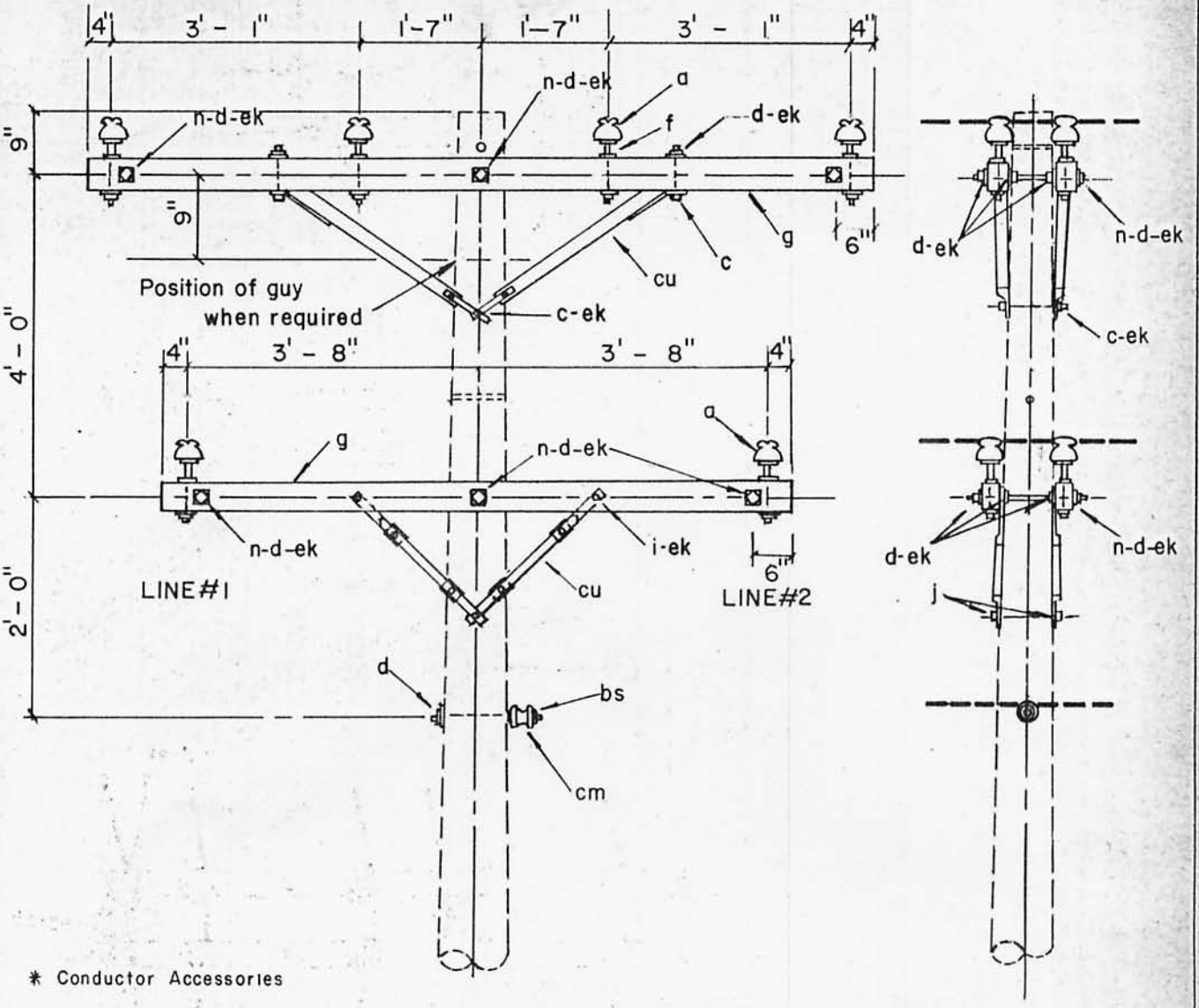
ITEM	NO.	MATERIAL		ITEM	NO.	MATERIAL	
a	12	Insulator, pin type		ek	4	Locknut, 1/2"	
c	1	Bolt, machine, 5/8"x 12"		ek	31	Locknut, 5/8"	
c	4	Bolt, machine, 1/2" x 6"		ek	8	Locknut, 3/8"	
d	31	Washer, 2 1/4"x 2 1/4"x 3/16", 13/16" hole		bv-1	1	Armor rod (single support) *	
d	4	Washer, round, 1 3/8" dia., 9/16" hole		bv-2	6	Armor rod (double support) *	
f	12	Pin, crossarm, steel, 5/8"x 10 3/4"		Tw	104'	Tie wire *	
g	2	Crossarm, 3 3/4"x 4 3/4"x 10'-0"					
g	4	Crossarm, 3 1/2"x 4 1/2"x 8'-0"					
l	8	Bolt, carriage, 3/8"x 4 1/2"					
j	4	Lag screw, 1/2"x 4"					
n	9	Bolt, double arming, 5/8"x 24"					
bs	1	Bolt, single upset, 5/8"x 14"					
cm	1	Spool insulator, 1 3/4" dia., groove					
cu	2	Brace, wood, 60" span					
cu	8	Brace, wood, 28"					

7.62/13.2 KV. 3-PHASE
CROSSARM CONSTRUCTION - DOUBLE CIRCUIT
DOUBLE PRIMARY SUPPORT AT 0° TO 5° ANGLE

MAY 15, 1973

3X-ARM TYPE

DC-C1-1A



* Conductor Accessories

ITEM	NO	MATERIAL
c	1	Bolt, machine, 5/8" x 12
a	12	Insulator, pin type
c	4	Bolt, machine, 1/2" x 6"
d	21	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16 hole
d	4	Washer, 1 3/8" diam. 9/16" hole
f	12	Pin, crossarm, steel, 5/8" x 10 3/4"
g	2	Crossarm, 3 3/4" x 4 3/4" x 10'-0"
g	2	Crossarm, 3 1/2" x 4 1/2 x 8'-0"
cm	1	Spool Insulator, 1 3/4" dia. groove
ek	21	Locknut, 5/8"
bv-1	1	Armor rod (Single Support) *
bv-2	6	Armor rod (Double Support) *
Tw	104'	Tie wire *

ITEM	NO	MATERIAL
cu	4	Brace wood, 28"
i	4	Bolt carriage, 3/8" x 4 1/2
j	2	Screw, lag, 1/2" x 4"
n	6	Bolt, double arming, 5/8" x 22"
bs	1	Bolt, single upset, 5/8" x 12"
cu	2	Brace wood, 60" span
ek	4	Locknut, 3/8"
ek	4	Locknut, 1/2"

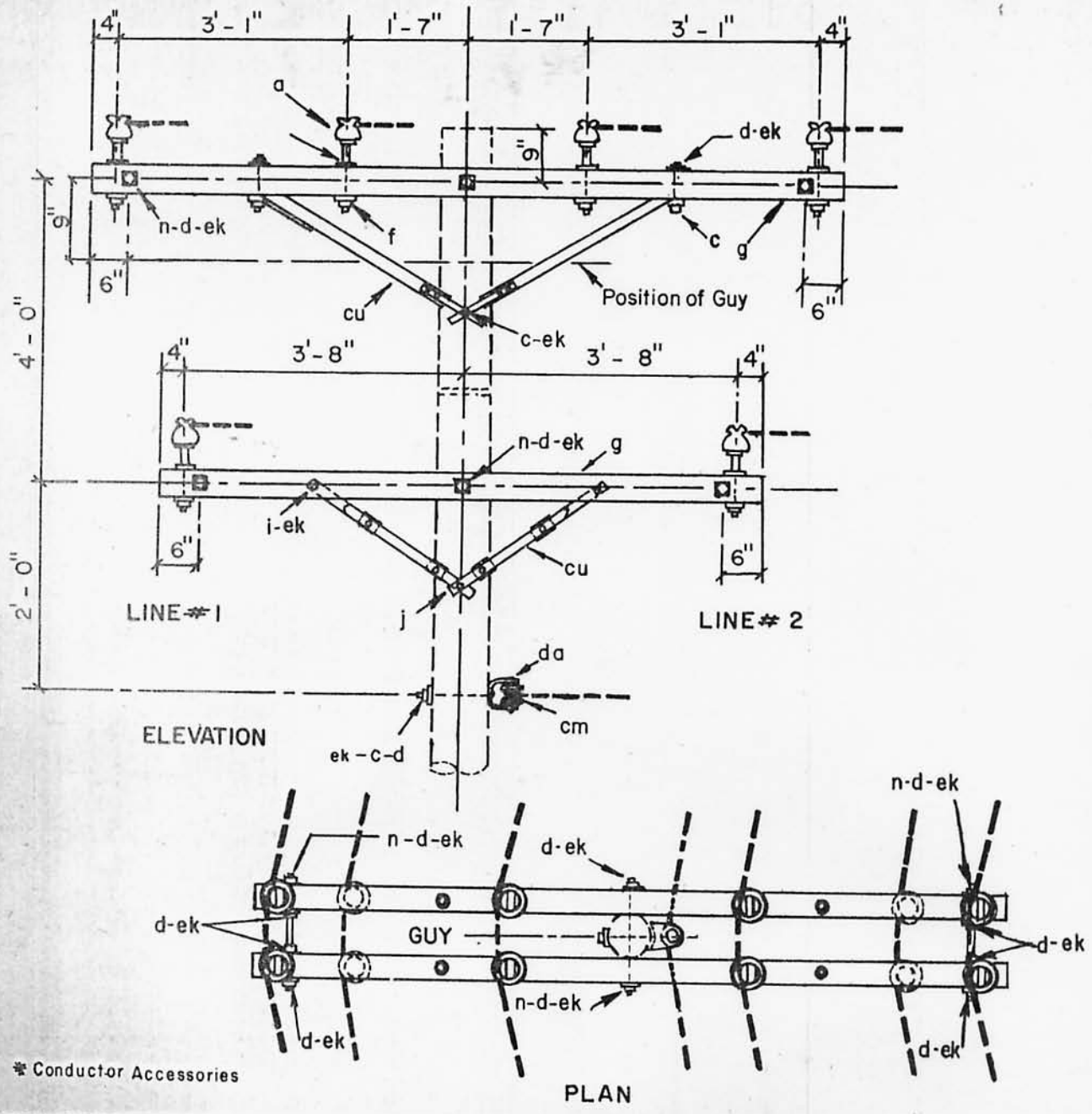
7.62/13.2 KV.

3-PHASE CROSSARM CONSTRUCTION-DOUBLE PRIMARY SUPPORT AT 0° TO 5° ANGLE

MAY 15, 1973

2X-ARM TYPE

DC-C2



* Conductor Accessories

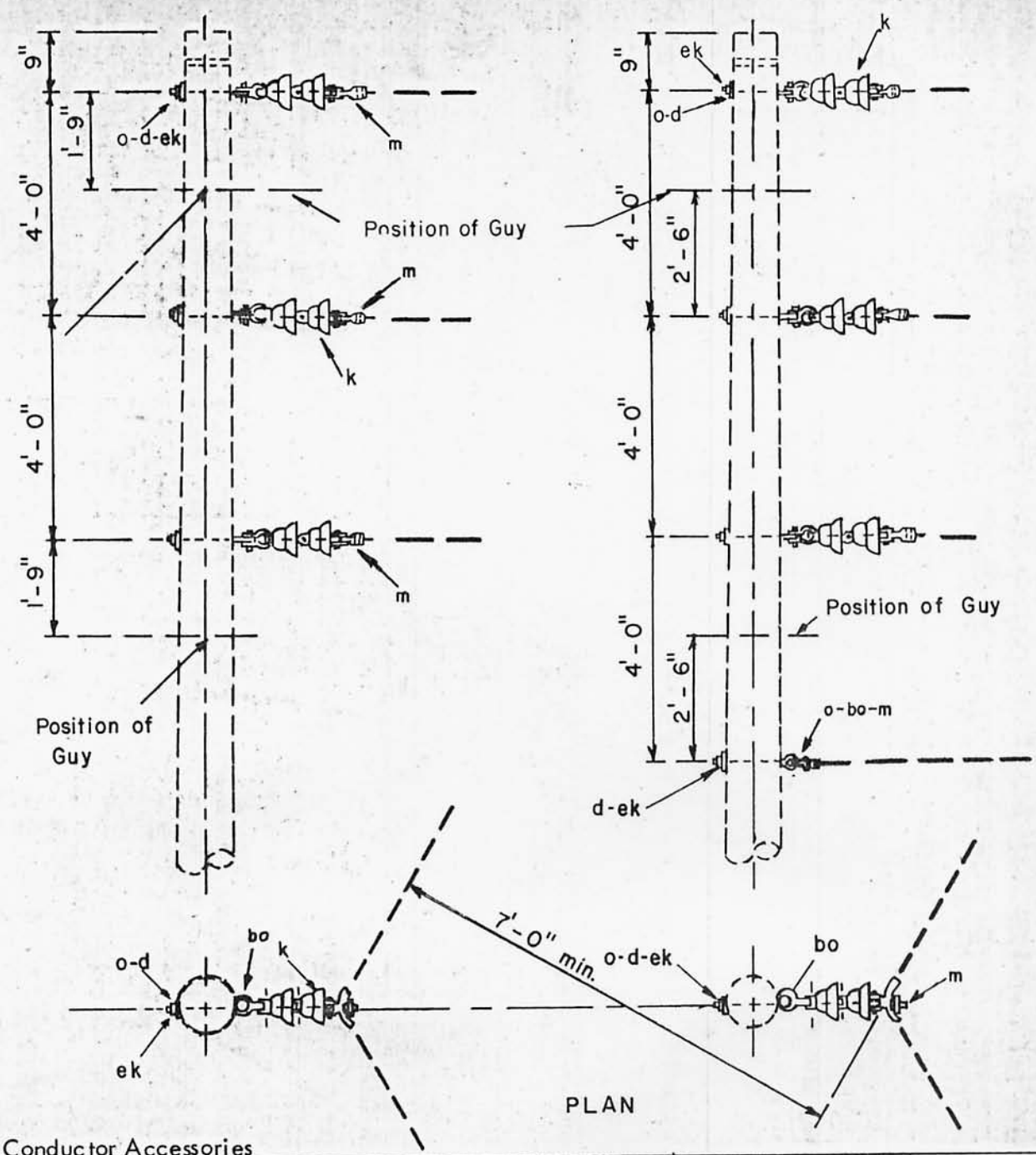
ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
a	12	Insulator, pin type	cu	4	Brace, wood, 28"
c	2	Bolt, machine, 5/8" x 14"	i	4	Bolt carriage, 3/8" x 4 1/2"
c	4	Bolt, machine, 1/2" x 6"	j	2	Screw Lag, 1/2" x 4"
			n	6	Bolt, double arming, 5/8" x 24"
d	21	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16 hole	cu	2	Brace wood, 60" span
d	4	Washer, rd. 1 3/8" dia., 9/16" hole	da	1	Bracket
f	12	Pin, crossarm, steel, 5/8" x 10 3/4"	ek	4	Locknut, 3/8"
g	2	Crossarm, 3 3/4" x 4 3/4" x 10'-0"	ek	4	Locknut, 1/2"
g	2	Crossarm, 3 1/2" x 8 1/2" x 8'-0"			
cm	1	Spool Insulator, 3" dia groove			
ek	22	Locknut, 5/8"			
bv-1	1	Armor rod (Single Support) *			
bv-2	6	Armor rod (Double Support) *			
TW	104'	Tie wire *			

7.62/13.2 KV. 3-PHASE, DOUBLE CIRCUIT CROSSARM CONSTRUCTION – 5° TO 30° ANGLE

MAY 15, 1973

2X-ARM TYPE

DC-C2-1



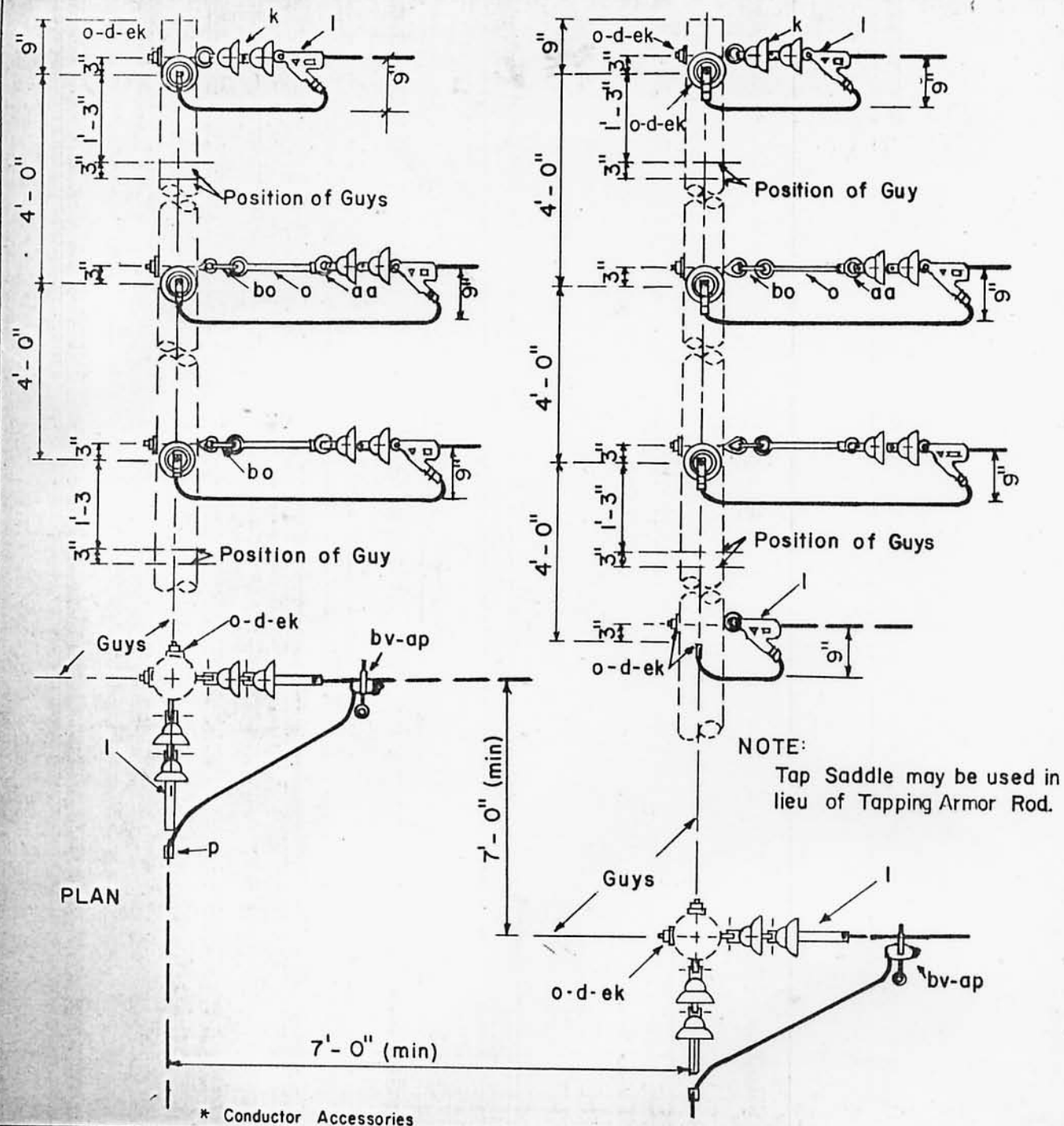
* Conductor Accessories

ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
d	7	Washer, 2¼" x 2¼" x 3/16", 13/16"hole	ba	6	Shackle, anchor
k	12	Insulator, suspension	ek	7	Locknut 5/8"
o	7	Bolt, eye, 5/8" x 14"			
m	7	Clamp, suspension			
bv-1	7	Armor rod (Single Support) *			
Tw	8'	Tie Wire *			

7.62/13.2 KV. 3-PHASE DOUBLE CIRCUIT VERTICAL CONSTRUCTION 30° TO 60° ANGLE

MAY 15, 1973

DC - C3



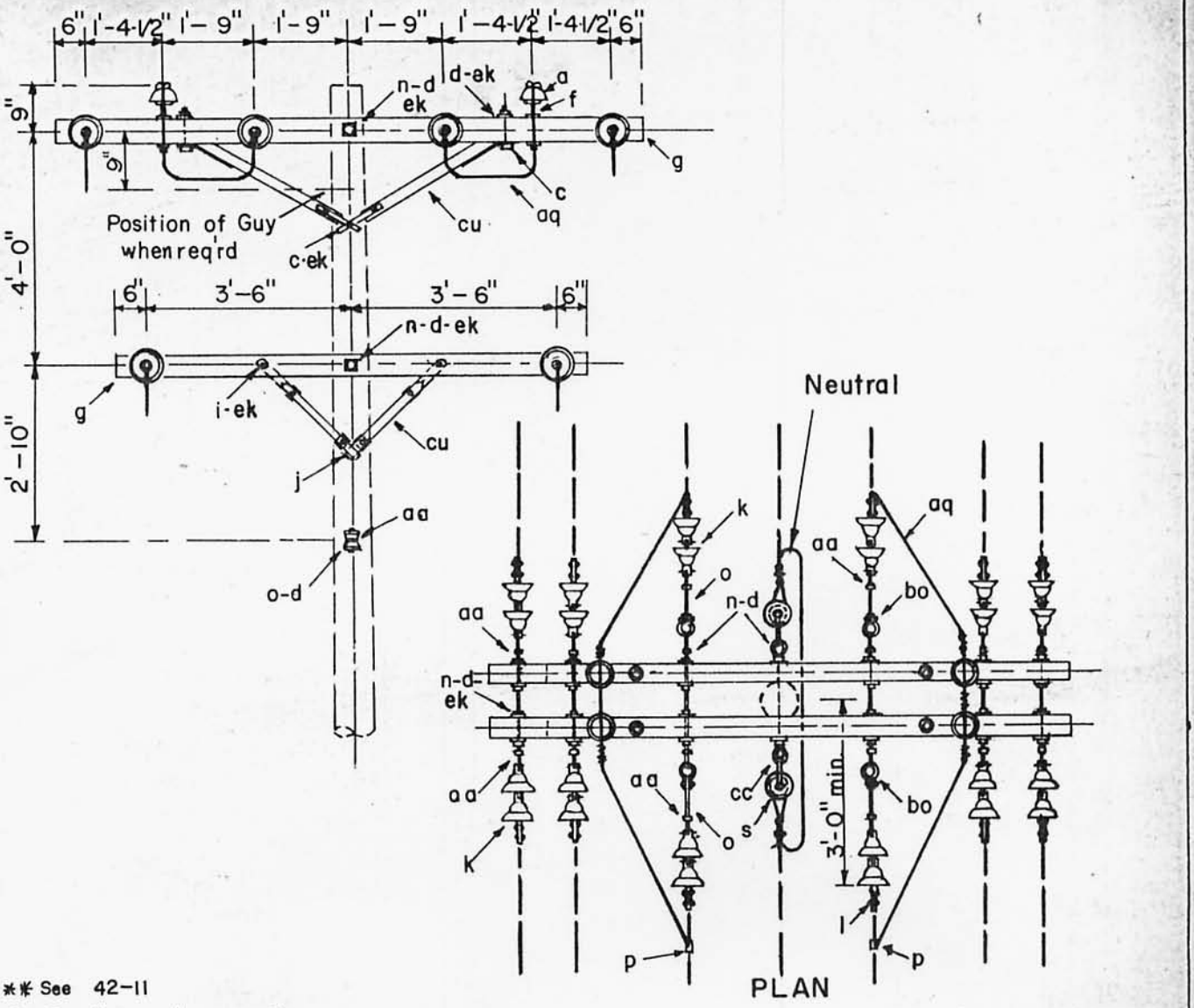
* Conductor Accessories

ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
d	14	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16" hole	aq		Jumpers
k	24	Insulator suspension	bo	8	Shackle, anchor
o	14	Bolt, eye oval, 5/8" x 14"	p	8	Connector, compression
ek	14	Locknot 5/8"	o	8	Bolt, eye oval, 5/8" x 18"
aa	8	Nut, eye, 5/8"	l	14	Clamp, deadend
ap	6	Hot, line clamp			
bv	6	Armor Rod (Tapping) *			

7.62/13.2 KV. 3-PHASE, DOUBLE CIRCUIT VERTICAL CONSTRUCTION 60° TO 90° ANGLE

MAY 15, 1973

DC-C4-1



** See 42-11

* Conductor Accessories

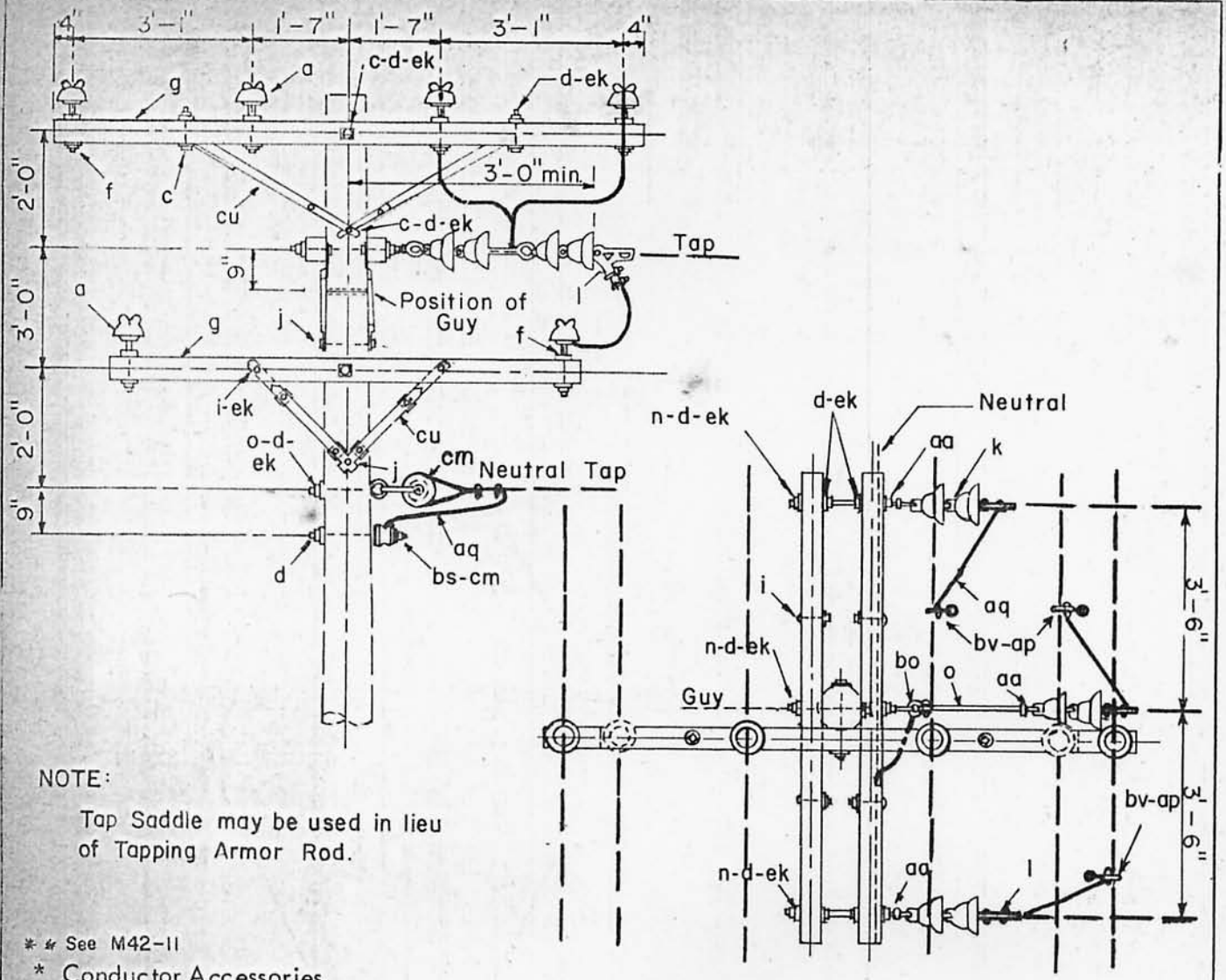
ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
a	4	Insulator, pin type			
c	1	Bolt, machine, 5/8" x 12"	cm	2	Spool Insulator, 3 dia., groove**
c	4	Bolt, machine, $\frac{1}{2}$" x 6"	cu	4	Brace, wood, 28"
d	30	Washer, $2\frac{1}{4}$" x $2\frac{1}{4}$" x 3/16", 13/16" hole	cu	2	Brace, wood, 60" span
d	4	Washer, rd., 1-3/8" diam., 9/16" hole	ek	4	Locknut $\frac{1}{2}$"
f	4	Pin, crossarm, steel 1-5/8" x 10-3/4"	ek	17	Locknut 5/8"
g	2	Crossarm, 3-3/4" x 4-3/4" x 10'-0"	ek	4	Locknut 3/8"
g	2	Crossarm, $3\frac{1}{2}$" x $4\frac{1}{2}$" x 8'-0"	Tw	32'	Tie Wire *
i	4	Bolt, carriage, 3/8" x $4\frac{1}{2}$"			
j	2	Screw, lag, $\frac{1}{2}$" x $4\frac{1}{2}$"			
k	24	Insulator, suspension			
l	12	Clamp, deadend			
o	4	Bolt, eye, oval, 5/8" x 18"			
o	1	Bolt, eye, oval, 5/8" x 12"			
n	8	Bolt, double arming, 5/8" x 24"			
p	7	Connector, compression			
s	2	Clevis, secondary, swinging			
T	4'	Armor Tape *			
aa	17	Nut, eye			
aq		Jumpers or leads as req'd			
bn	4	Clamp, loop, deadend			
bo	4	Shackle anchor			

7.62/13.2 KV.
3 - PHASE, CROSSARM CONSTRUCTION
DOUBLE CIRCUIT - DEADEND (DOUBLE)

2X - ARM TYPE

MAY 15, 1973

DC-C8



NOTE:

Tap Saddle may be used in lieu of Tapping Armor Rod.

** See M42-11

* Conductor Accessories

ITEM	NO.	MATERIAL
a	6	Insulator, pin type
c	1	Bolt, machine, 5/8" x 12"
c	2	Bolt, machine, $\frac{1}{2}$" x 6"
d	17	Washer, $2\frac{1}{4}$" x $2\frac{1}{4}$" x 3/16", x 13/16" hole
d	2	Washer, rd., 1-3/8" dia., 19/16" hole
f	6	Pin, steel crossarm, 5/8" x 10-3/4"
g	1	Crossarm, 3-3/4" x 4-3/4" x 10'-0"
g	3	Crossarm, $3\frac{1}{2}$" x $4\frac{1}{2}$" x 8'-0"
i	6	Bolt carriage, 3/8" x $4\frac{1}{2}$"
j	3	Screw, lag, $\frac{1}{2}$" x 4"
k	6	Insulator, suspension
l	3	Clamp, deadend
n	3	Bolt, double arming, 5/8" x 24"
o	1	Bolt, eye, oval, 5/8" x 12"
o	1	Bolt, eye, oval, 5/8" x 18"
p	2	Connector compression
s	1	Clevis, secondary, swinging
T	1	Armor Tape *
c	2	Bolt, machine, 5/8" x 14"
aa	4	Nut, eye, 5/8"
aq		Jumpers or leads, as req'd
bn	2	Clamp, loop, deadend
bo	1	Shackle, anchor

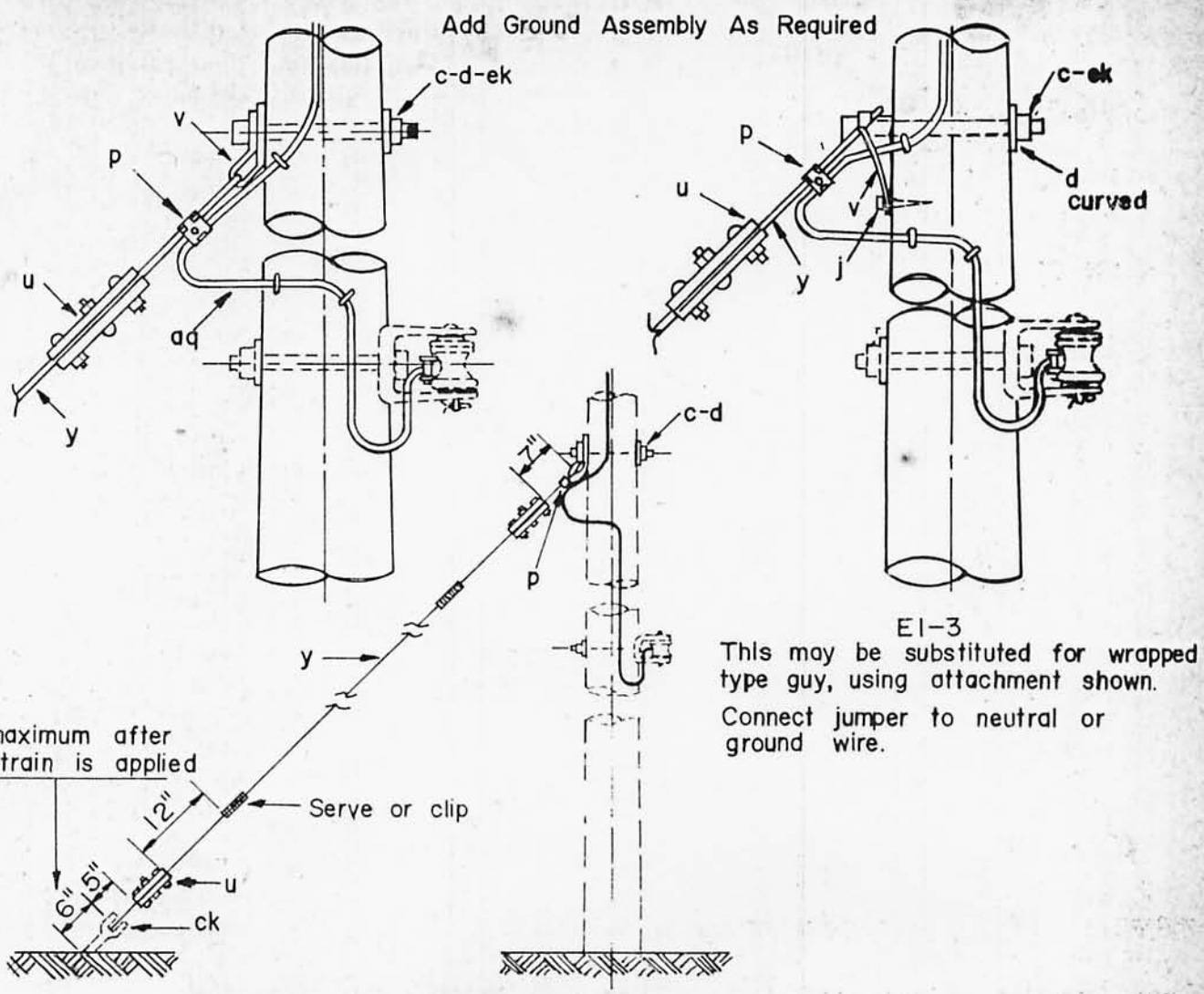
ITEM	NO.	MATERIAL	
bs	1	Bolt, single upset, 5/8" x 12"	
bv	3	Armor Rod (Tapping) *	
bv-1	7	Armor Rod (Single Support) *	
cm	1	Spool, Insulator, 1-3/4" dia, groove	
cm	1	Spool, Insulator, 3" dia., groove	**
cu	6	Brace, wood, 28"	
cu	1	Brace, wood, 60" span	
ek	2	Locknut $\frac{1}{2}$"	
ek	11	Locknut 5/8"	
ek	6	Locknut 3/8"	
ap	3	Hot line Clamp	
Tw	56'	Tie Wire *	

7.62/13.2 KV. 3-PHASE
CROSSARM CONSTRUCTION - DOUBLE CIRCUIT
3 - PHASE TAP AT 0° TO 5° ANGLE

MAY 15,1973

2X- ARM TYPE

DC-C25



E1-3

This may be substituted for wrapped type guy, using attachment shown.

Connect jumper to neutral or ground wire.

See guide drawings M30-1 and M30-2

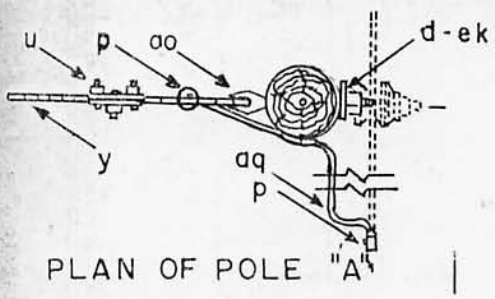
ITEM	MATERIAL	ASSEMBLY UNIT E1-1 1/4"GUY WIRE NO. REQ'D.	E1-2 3/8"GUY WIRE NO. REQ'D.	E1-3 7/16"GUY WIRE NO. REQ'D.
c	Bolt, machine, 5/8"	1-8"	1-8"	1-9"
d	Washer, 2 1/4"x 2 1/4"x 3/16", 13/16" hole	1	1	
d	Washer, curved, 3"x 3"x 5/16", 11/16" hole			1
j	Screw, lag, 1/2"x 4"			1
p	Connector, parallel groove, compression	2	2	2
u	Clamp, guy, 3-bolt, 6" long	2-light duty	2-light duty	2-heavy duty
v	Guy attachment	1	1	1
y	Guy wire, S.M., 7-strand	50'	50'	50'
ck	Clamp, anchor rod bonding	1	1	1
aq	Jumper, #4, 3 strand aluminum alloy	5'	5'	5'
ek	Locknut, 5/8"	1	1	1

7.62/13.2 KV.

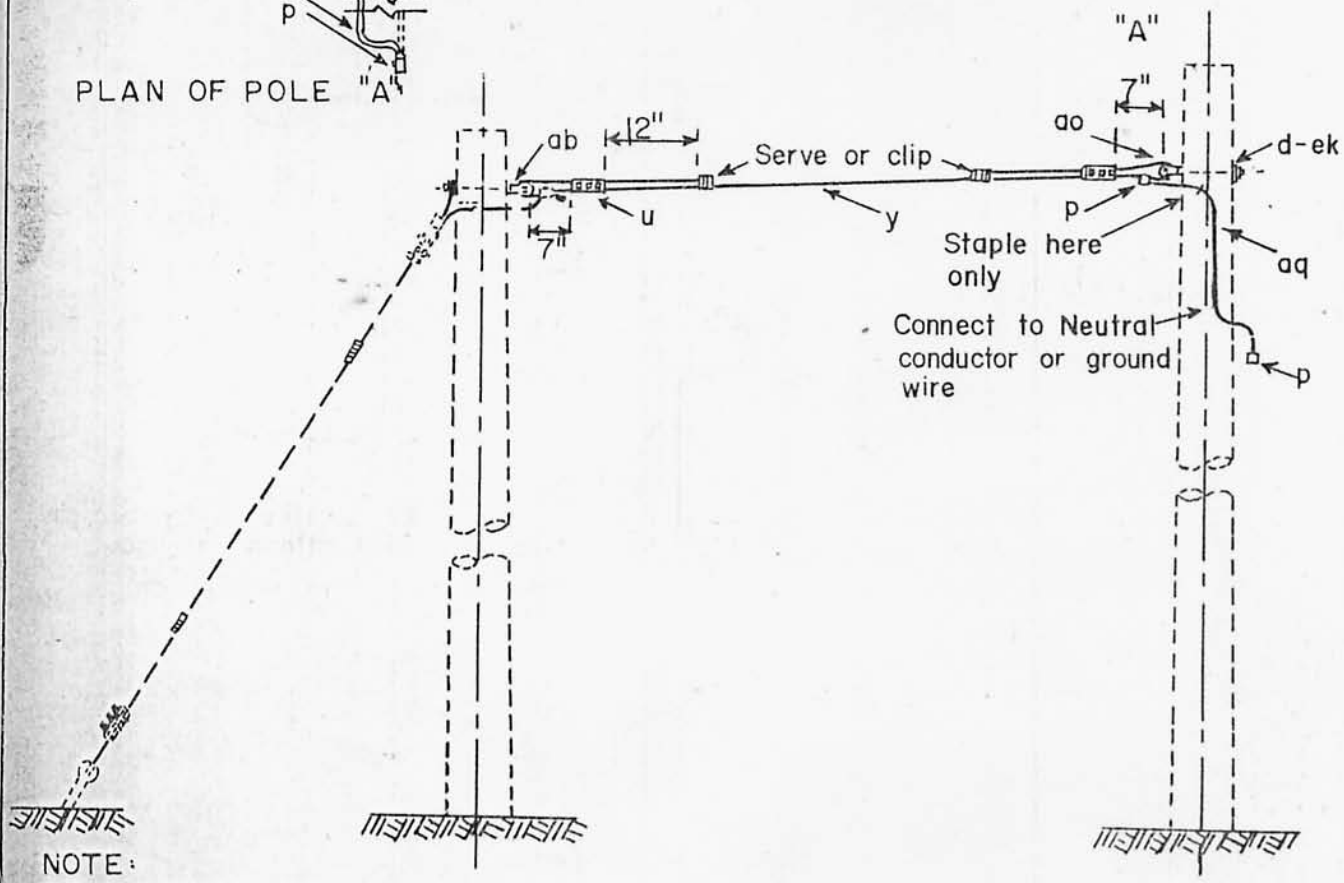
SINGLE DOWN GUY, THROUGH BOLT TYPE

MAY 15, 1973

E1-1, E1-2, E1-3



PLAN OF POLE "A"



NOTE:
Other accepted and equivalent items of deadend material may be substituted for the 3-bolt clamp shown.

ITEM	MATERIAL	ASSEMBLY UNIT E2-1 1/4" GUY WIRE NO. REQ'D.	E2-2 3/8" GUY WIRE NO. REQ'D.	E2-3 7/16" GUY WIRE NO. REQ'D.
d	Washer, 2 1/4"x 2 1/4"x 3/16", 13/16" hole	1		
d	Washer, curved, 3"x 3"x 5/16", 11/16" hole		1	1
y	Guy wire, S.M. 7-strand	70'	70'	70'
u	Clamp guy, 3-bolt	2-light duty	2-heavy duty	2-heavy duty
ab	Nut, thimble type eye, 5/8"	1	1	1
ao	Bolt, thimble type eye, 5/8"	1-8"	1-9"	1-10"
aq	Jumper, #4 AWG, 3-strand aluminum alloy	5'	5'	5'
p	Connector, compression	2	2	2
ek	Locknut, 5/8"	1	1	1

7.62/13.2 KV

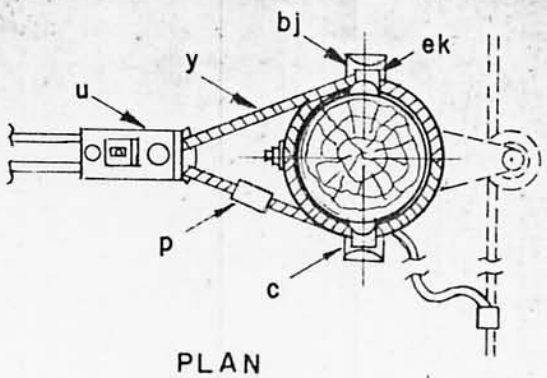
SINGLE OVERHEAD GUY, THROUGH BOLT TYPE

MAY 15, 1973

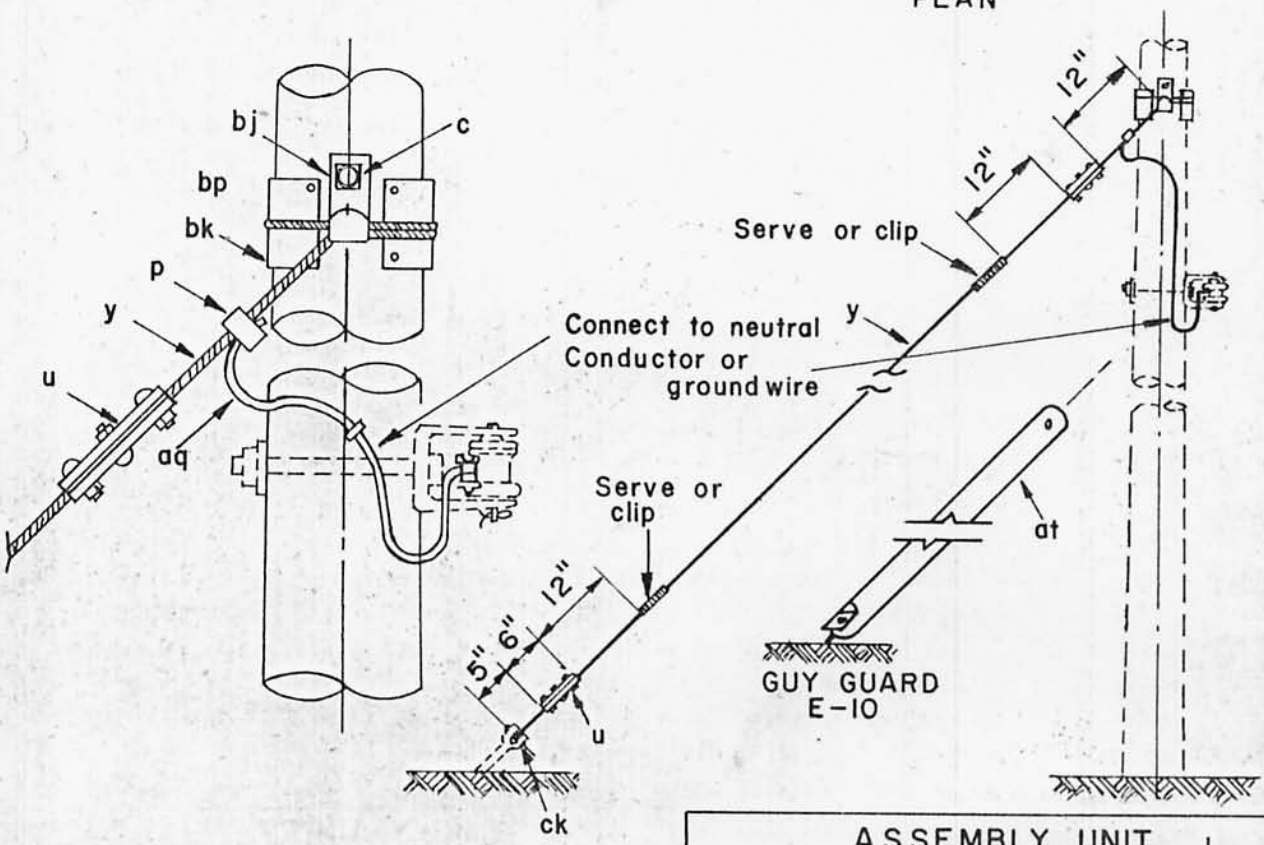
F2-1, E2-2, E2-3

NOTE:

1. Other accepted and equivalent (Item u) guy clamps may be substituted for three bolt clamps shown.
2. Assemblies E1-2 and E1-3 (throughbolt type) are preferred unit.



PLAN

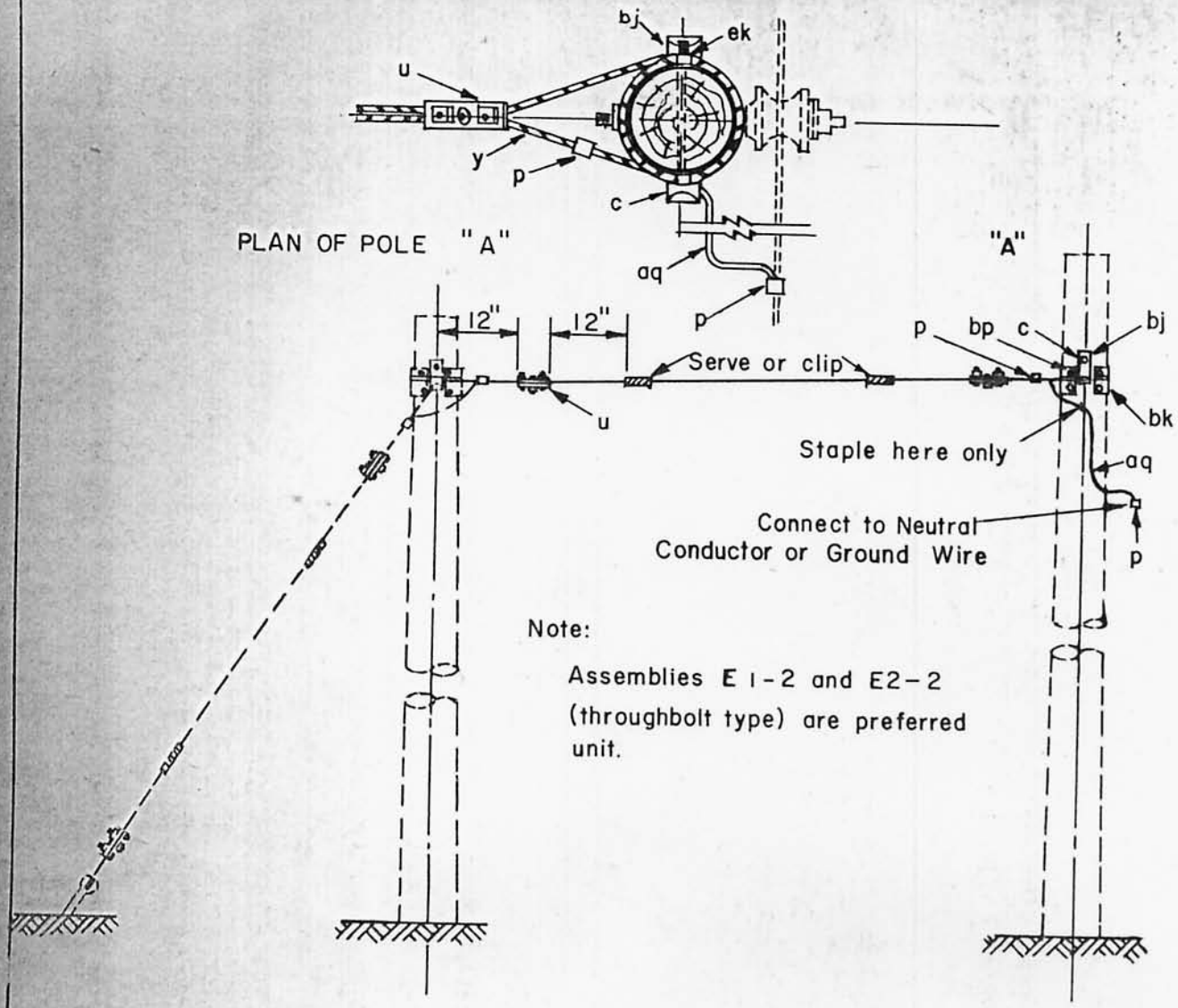


ITEM	MATERIAL	ASSEMBLY UNIT E3-2 3/8" Guy Wire No. Req'd.	ASSEMBLY UNIT E3-3 7/16" Guy Wire No. Req'd.	E-10 Guy Guard
c	Bolt machine, 5/8" x 10"	1	1	
p	Connector, compression	2	2	
u	Clamp, guy, 3 bolt, 6" long	2 Heavy duty	2 Heavy duty	
y	Guy Wire, S-M, 7-strand	50'	50'	
aq	Jumper, #4 AWG, 3 strand aluminum alloy	5'	5'	
at	Guy guard, 8' min. length			1
bj	Guy Hook, J	2	2	
bk	Guy Plate, 4" x 8", 14 gauge	2	2	
bp	Nail, 8 penny, galvanize	8	8	
ck	Clamp, anchor rod bonding	1	1	
ek	Locknut, 5/8"	1	1	

7.62/13.2 KV.
SINGLE DOWN GUY, WRAPPED TYPE

MAY 15, 1973

E3-2, E3-3, E-10



Note:

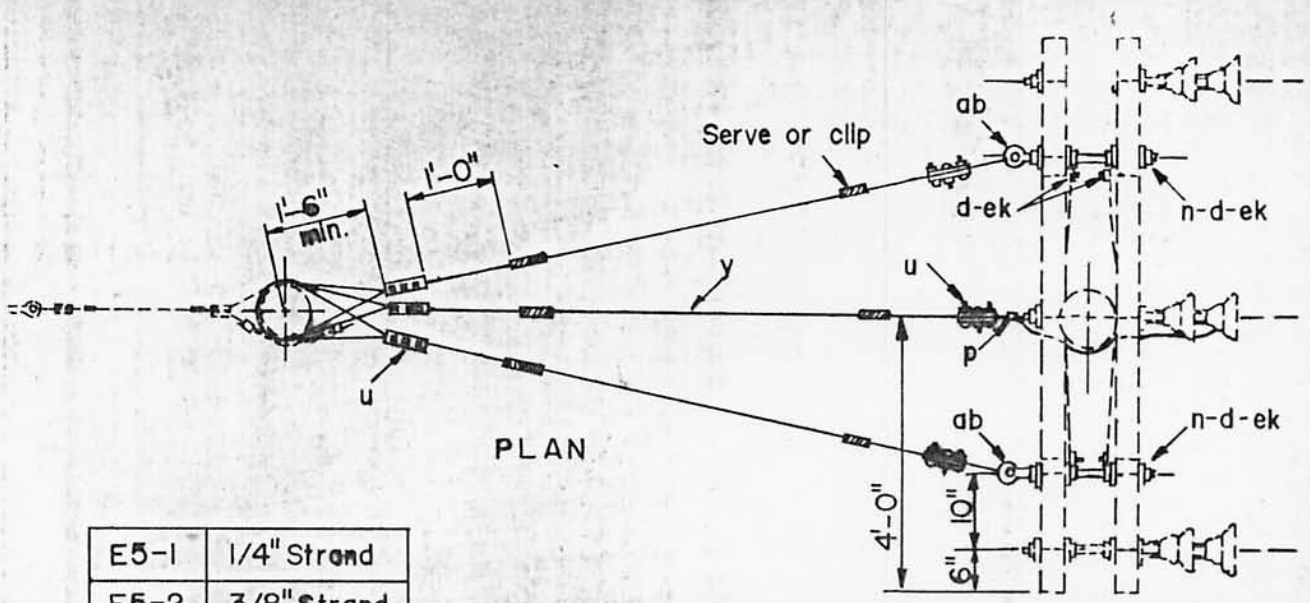
Assemblies E 1-2 and E2-2 (throughbolt type) are preferred unit.

ITEM	MATERIAL	ASSEMBLY UNIT		
		E4-2 3/8" Guy Wire	E4-3 7/16" Guy Wire	
c	Bolt, machine, 5/8"	No. REQ'D	No. REQ'D	
p	Connector, compression	1 – 10"	1 – 12"	
u	Deadend for guy strand	2	2	
y	Guy Wire, S-M, 7-Strand	2-Heavy Duty	2-Heavy Duty	
aq	Jumper #4 AWG, 3 strand aluminum alloy	70'	70'	
bj	Guy Hook, J	5'	5'	
bk	Guy Plate, 4" x 8", 14 gauge	2	2	
bp	Nail, 8 penny, galvanize	2	2	
ek	Locknut	8	8	
		1	1	

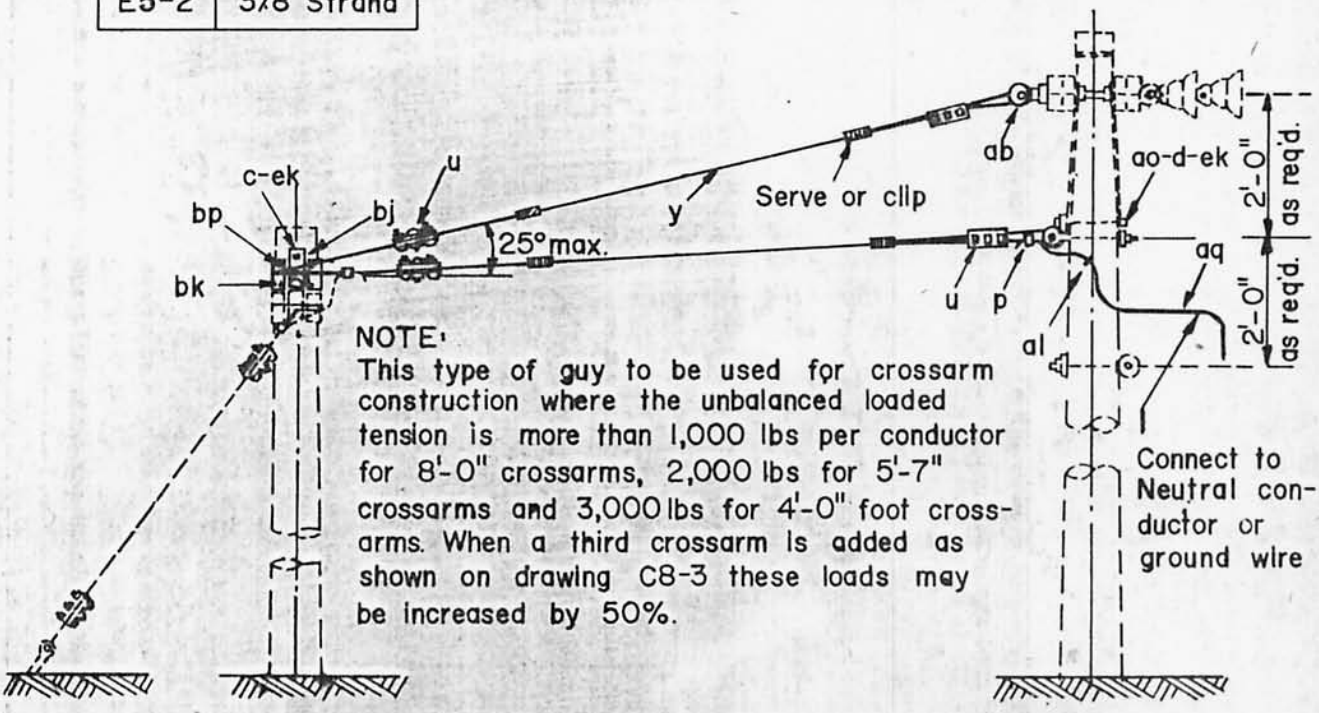
7.62/13.2 KV.
SINGLE OVERHEAD GUY, WRAPPED TYPE

MAY 15,1973

E4-2, E4-3



E5-1	1/4" Strand
E5-2	3/8" Strand



NOTE:
This type of guy to be used for crossarm construction where the unbalanced loaded tension is more than 1,000 lbs per conductor for 8'-0" crossarms, 2,000 lbs for 5'-7" crossarms and 3,000 lbs for 4'-0" foot crossarms. When a third crossarm is added as shown on drawing C8-3 these loads may be increased by 50%.

ITEM	NO.	MATERIAL
d	9	Washer, 2 1/4"x 2 1/4"x 3/16", 13/16" hole
n	2	Bolt, double arming, 5/8" x 24"
p	4	Connectors, compression
u	6	Clamp, guy, 3 bolt, 6" long
y	100'	Wire, guy, S.M. 7 strand
c	1	Bolt, machine, 5/8"x 10"
ek	8	Locknut, 5/8"
bp	8	Nail, penny, galv.

ITEM	NO.	MATERIAL
ab	2	Nut, thimble eye type, 5/8"
ao	1	Bolt, thimble eye type, 5/8"x 12"
aq	5'	Jumper, #4 AWG, 3 strand aluminum alloy
al	1	Staple, ground wire
bk	2	Guy plate, 4"x 8", #14 gauge
bj	2	Guy hook, J

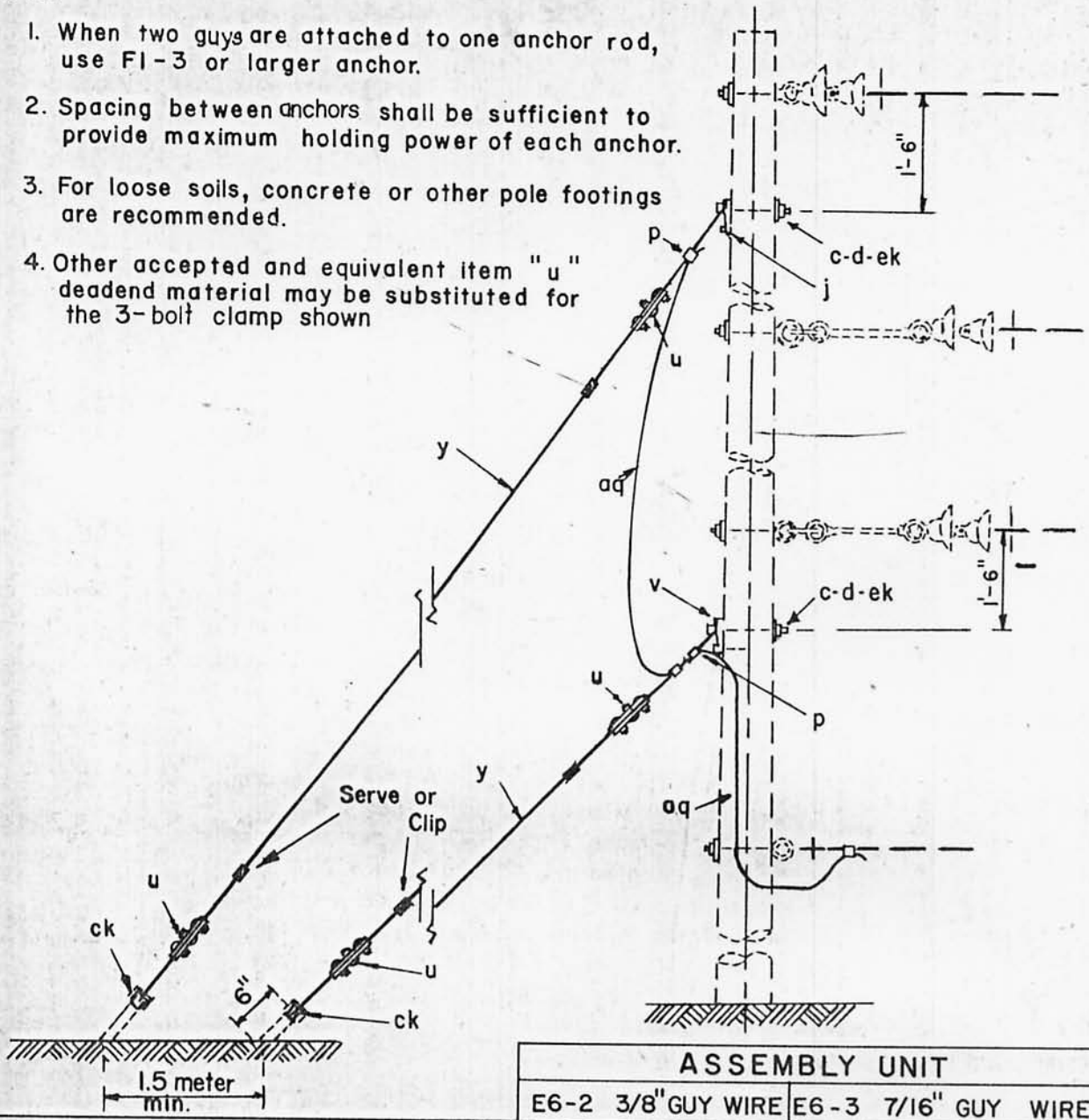
7.62/13.2 KV.
DEADEND GUY
CROSSARM CONSTRUCTION

MAY 15, 1973

E5-1, E5-2

NOTE:

1. When two guys are attached to one anchor rod, use FI-3 or larger anchor.
2. Spacing between anchors shall be sufficient to provide maximum holding power of each anchor.
3. For loose soils, concrete or other pole footings are recommended.
4. Other accepted and equivalent item "u" deadend material may be substituted for the 3-bolt clamp shown



ITEM	MATERIAL	ASSEMBLY UNIT E6-2 3/8" GUY WIRE No. Req'd.	ASSEMBLY UNIT E6-3 7/16" GUY WIRE No. Req'd.
c	Bolt, machine, 5/8"	2 - 10"	2 - 12"
d	Washer, 3" x 3" x 5/16" curved		2
d	Washer, 2 1/4" x 2 1/4" x 13/16" hole	2	
j	Screw, lag, 1/2" x 4"		2
p	Connector, compression	4	4
u	Clamp, guy, 3 Bolt, HD	4	4
v	Guy attachment, Mall Iron, Heavy Duty		2
v	Guy attachment, through bolt type	2	
y	Guy wire, S-M, 7 strand	100'	100'
aq	Jumpers, 4 AWG, 3 stand alluminum alloy	10'	10'
ck	Clamp, guy bond	2	2
ek	Locknut, 5/8"	2	2

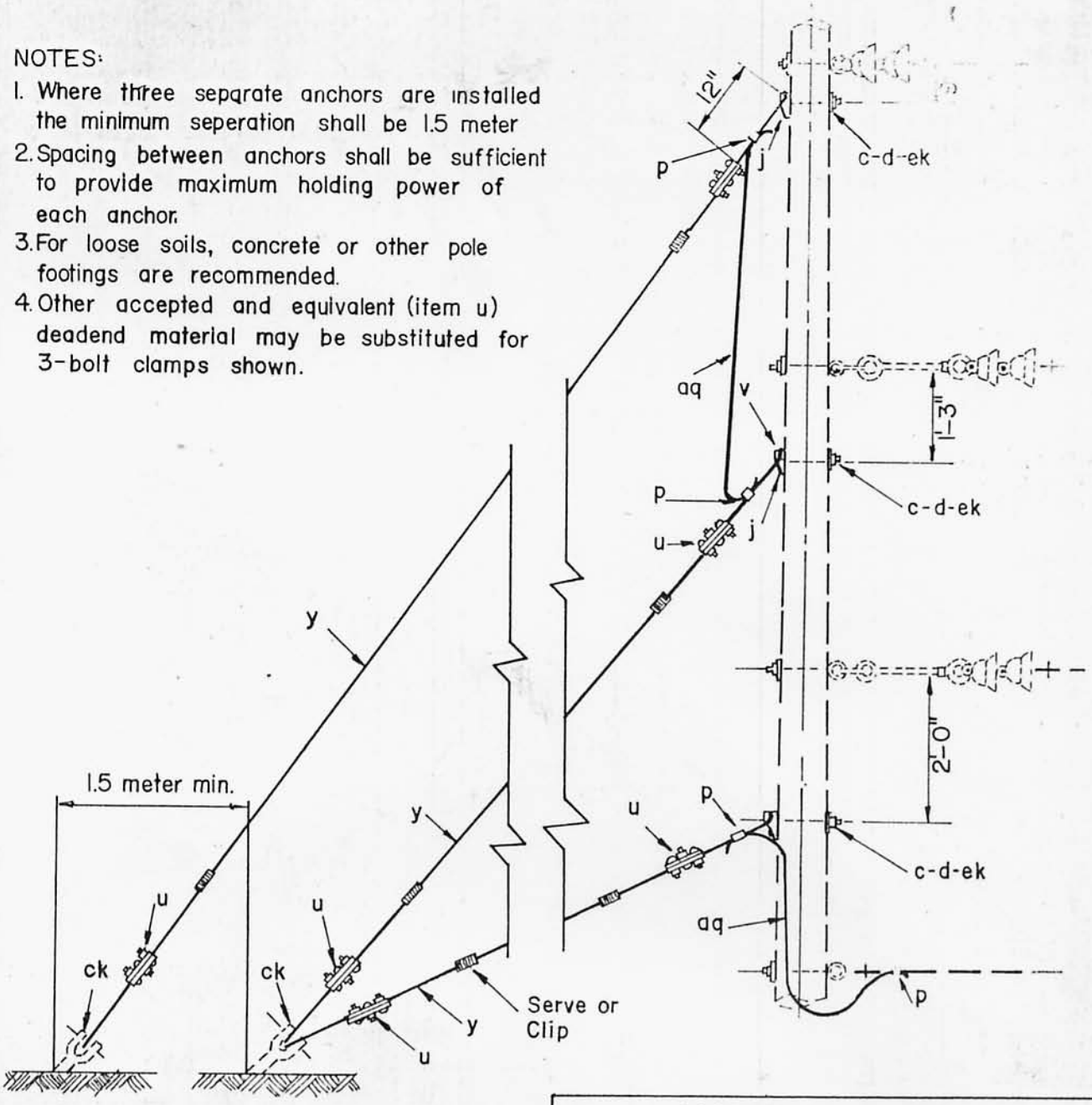
7.62/13.2 KV. DOUBLE DOWN GUY

MAY 15, 1973

E6-2, E6-3

NOTES:

1. Where three separate anchors are installed the minimum seperation shall be 1.5 meter
2. Spacing between anchors shall be sufficient to provide maximum holding power of each anchor.
3. For loose soils, concrete or other pole footings are recommended.
4. Other accepted and equivalent (item u) deadend material may be substituted for 3-bolt clamps shown.



ITEM	MATERIAL	ASSEMBLY UNIT E7-2 - 3/8" GUY WIRE No. Required	ASSEMBLY UNIT E7-3 - 7/16" [illegible] No. Required
c	Bolt, machine, 5/8"x 12"	3	3
d	Washer, curved, 3"x 3"x 5/16"	3	3
j	Screw, lag, 1/2"x 4"	3	
p	Connectors, compression	4	4
u	Clamp, guy, heavy duty	6	6
v	Guy attachment, malleable iron, heavy duty	3	3
y	Guy wire S.M., 7-strand	150'	150
aq	Jumper, # 4 AWG, 3-strand aluminum alloy	15'	12
ck	Clamp, anchor rod bond, for single eye rod / for twin eye rod	|	|
ek	Locknut	3	3

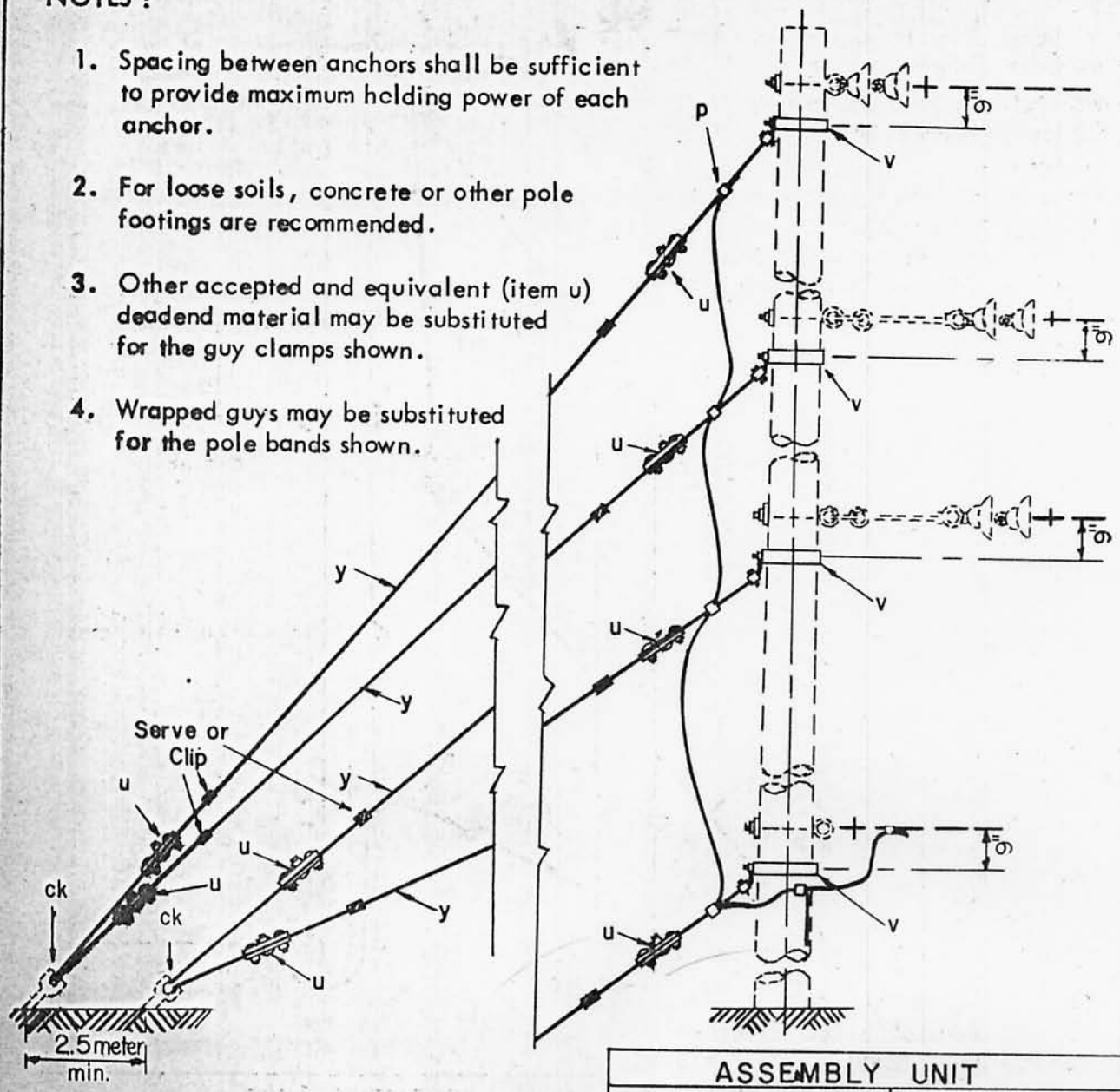
7.62/13.2 KV.
THREE DOWN GUYS (LARGE CONDUCTORS)

MAY 15, 1973

E7-2, E7-3

NOTES :

1. Spacing between anchors shall be sufficient to provide maximum holding power of each anchor.
2. For loose soils, concrete or other pole footings are recommended.
3. Other accepted and equivalent (item u) deadend material may be substituted for the guy clamps shown.
4. Wrapped guys may be substituted for the pole bands shown.

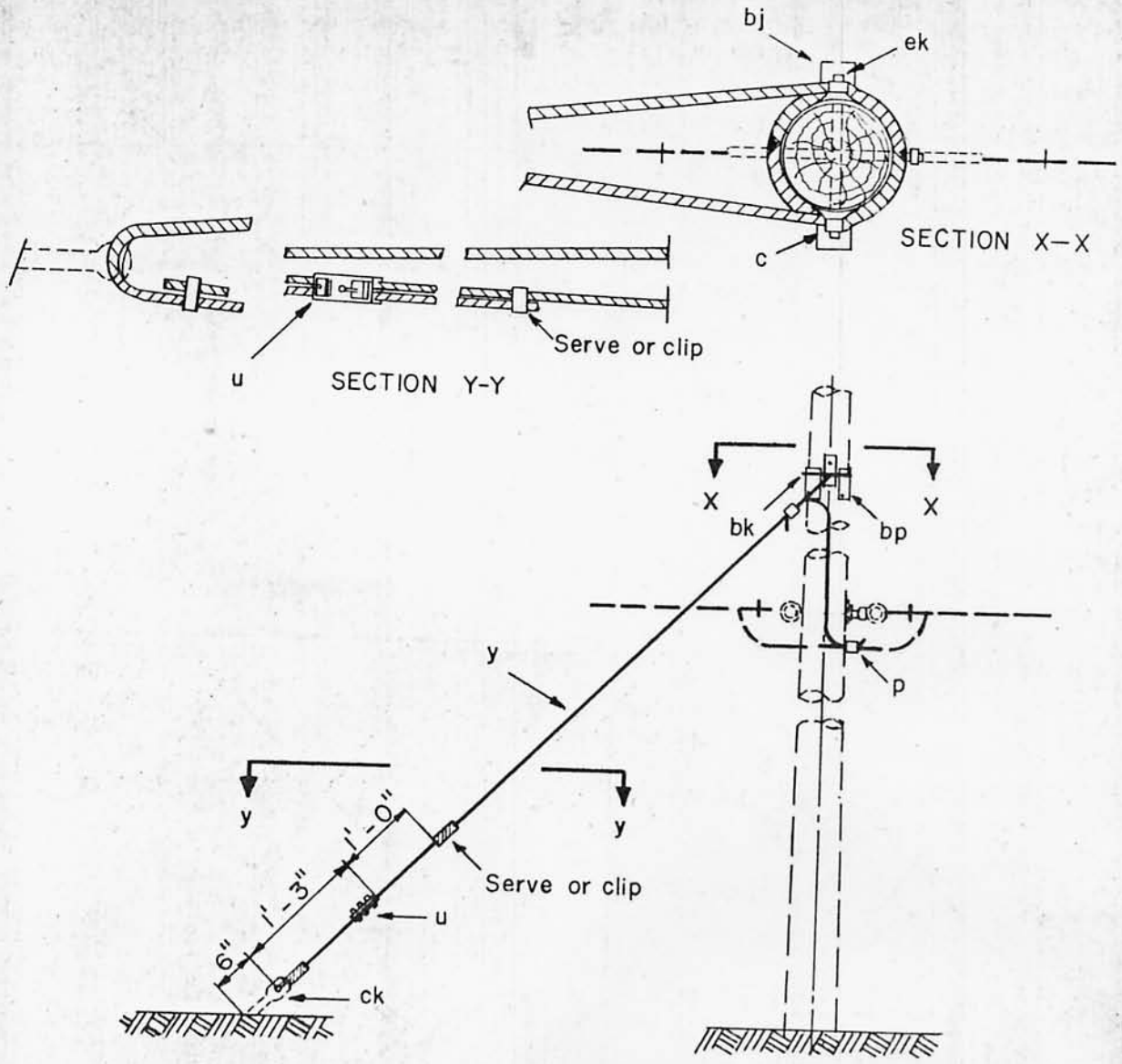


ITEM	MATERIAL	ASSEMBLY UNIT E8-2-3/8"GUY WIRE NO. REQUIRED	ASSEMBLY UNIT E8-3-7/16"GUY WIRE NO. REQUIRED
p	Connector, compression	4	4
u	Clamp, guy, 3 bolt HD.	8	8
v	Guy attachment, pole band type	4	4
y	Guy Wire S. M. 7 strand	200'	200'
ag	Jumper #4 AWG, 3 strand alluminum alloy	20'	20'
ck	Clamp guy bonding, For twineye rod	2	2

7.62/13.2 KV. FOUR DOWN GUYS (LARGE CONDUCTORS)

MAY 15, 1973

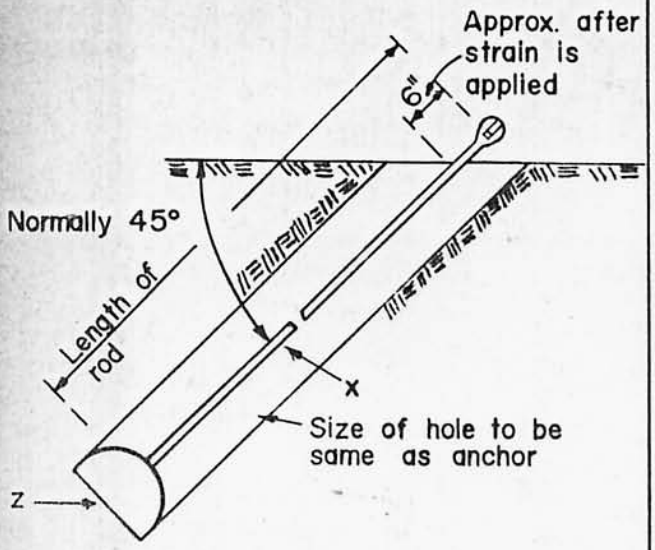
E8-2, E8-3



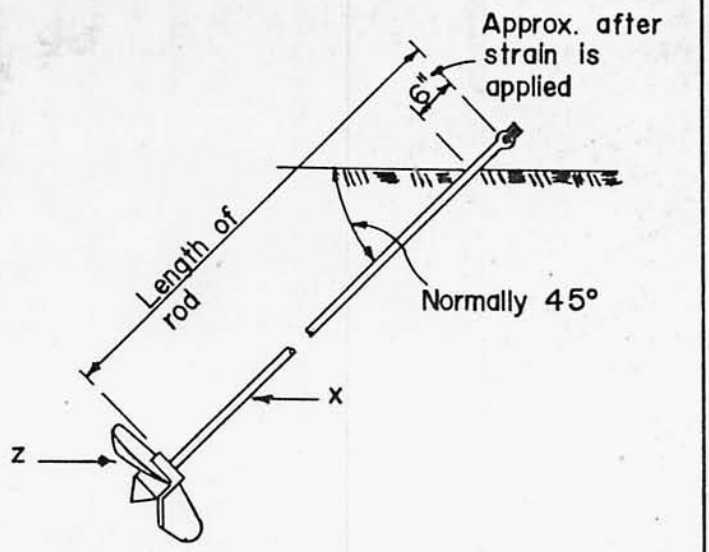
ITEM	MATERIAL	ASSEMBLY UNIT E 1 1/4" GUY WIRE	ASSEMBLY UNIT E 2 3/8" GUY WIRE		
		No. REQ'D	No. REQ'D		
c	Bolt machine, 5/8"	1 — 10"	1 — 12"		
u	Clamp guy, 3 bolt	1-LIGHT DUTY	1-HEAVY DUTY		
y	Guy wire, S-M	80'	80'		
ck	Clamp anchor rod bonding	1	1		
bk	Guy plate, 4"x 8", 14 gauge	2	2		
bj	Guy hook, J	2	2		
bp	Nail, 8 penny, galv.	8	8		
aq	Jumper, 4 AWG, 3 strand aluminum alloy	5'	5'		
p	connector, compression	2	2		
ek	Locknut, 5/8"	1	1		

7.62/13.2 KV.
SINGLE LOOP GUY, WRAPPED TYPE

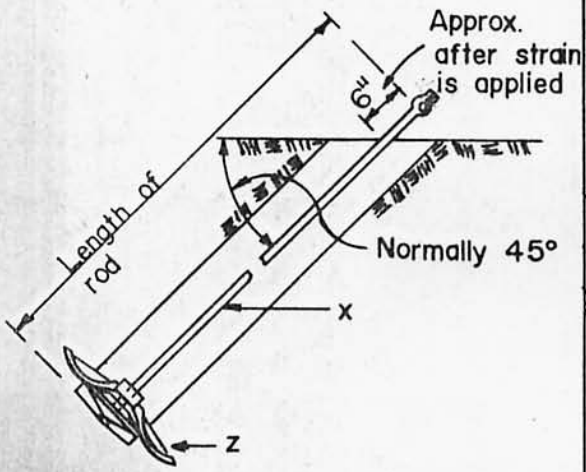
E1, E2



CONE
FI-IC, FI-2C, FI-3C,



SCREW
FI-IS, FI-2S, FI-3S,



EXPANDING

FI-1, FI-2, FI-3,

Note:
Projection of anchor rods above earth may be increased to a max. 12" in cultivated fields or other locations where necessary to prevent burying of the rod eye.

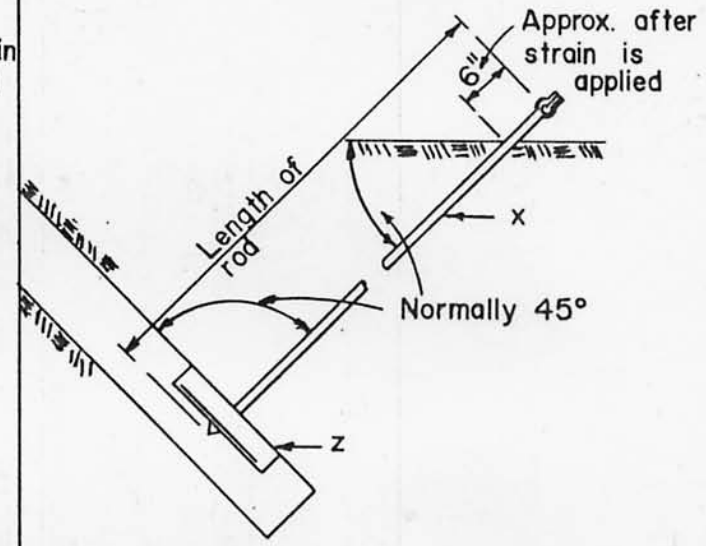


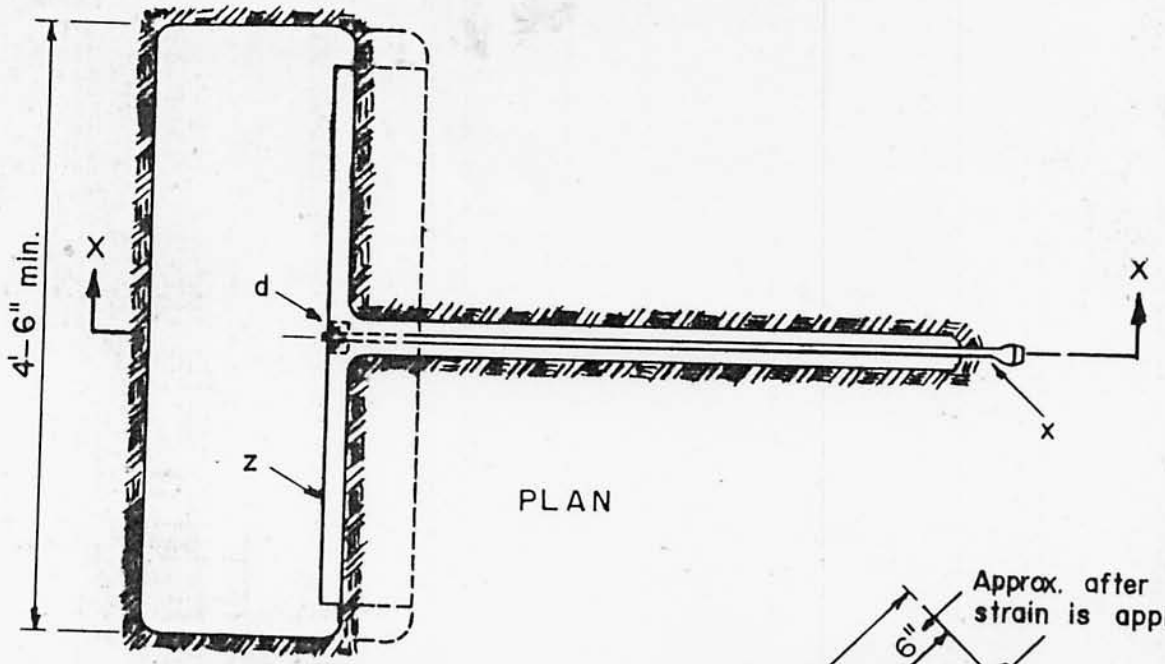
PLATE
FI-IP, FI-2P, FI-3P,

		ASSEMBLY UNIT					
		FI-1		FI-2		FI-3	
	Holding Power in Ordinary Soil (pounds)	6,000		8,000		10,000	
ITEM	MATERIAL	NO.		NO.		NO.	
x	Rod, anchor, thimble eye	1	5/8"x 7'-0"	1	5/8"x 7'-0"		
x	Rod, anchor, twin eye					1	3/4"x 8'-0"
z	Anchor, expanding type	1	2 way	1	4 way	1	8 way

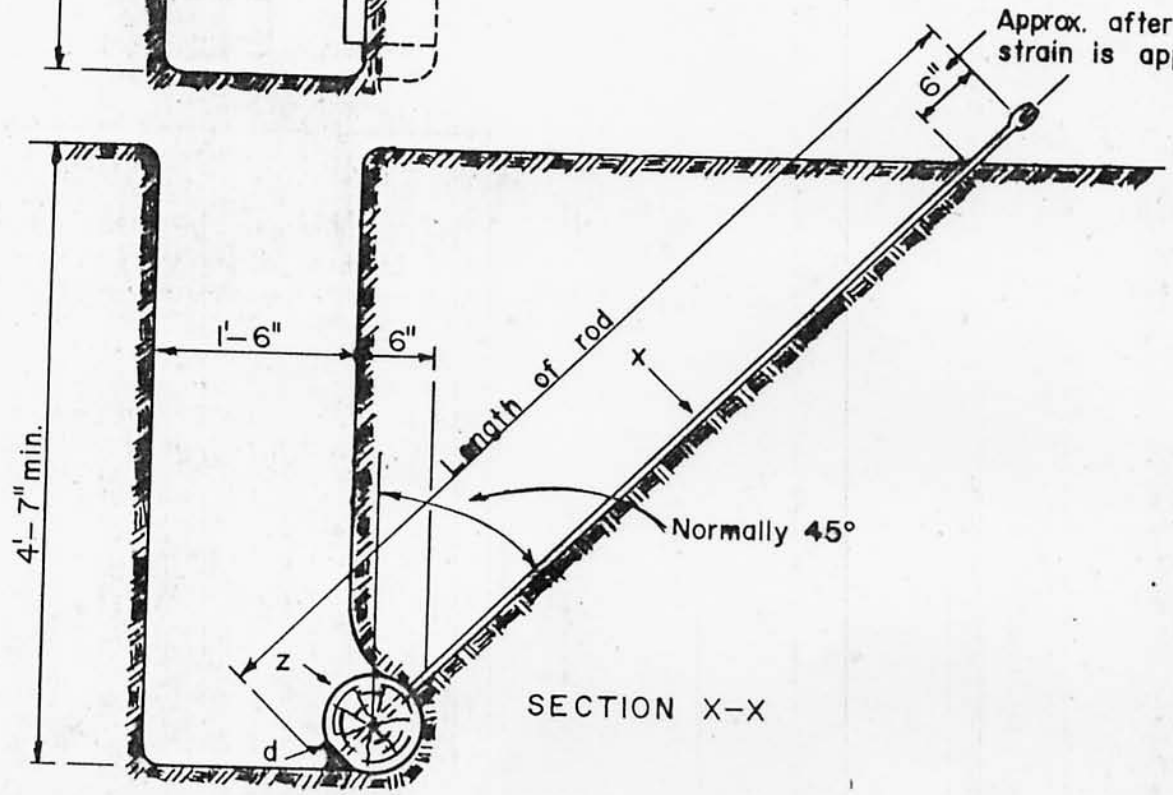
LINE ANCHOR ASSEMBLIES

MAY 15, 1973

FI-1 To 3



PLAN



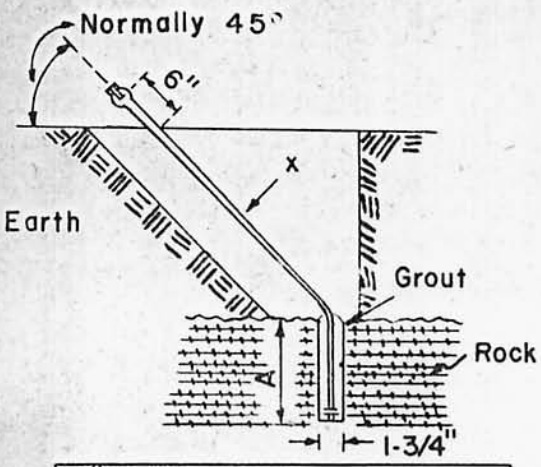
SECTION X-X

ITEM	MATERIAL	ASSEMBLY UNIT F2-1 NO.	F2-1 TYPE	F2-2 NO.	F2-2 TYPE	F2-3 NO.	F2-3 TPYE	F2-4 NO.	F2-4 TPYE
d	Washer, 13/16" hole, (1 1/8" min. for F2-4)	1	4"x4"x1/2"	1	4"x4"x1/2"	1	4"x4"x1/2"	1	4"x4"x1/2"
x	Rod, anchor, thimble type eye	1	5/8"x7'-0"	1	3/4"x8'-0"	1	3/4"x8'-0"	1	1"x10'-0"
z	Anchor, (cresoted log)	1	8"Øx4'-0"	1	9"Øx4'-6"	1	10"Øx5'-0"	1	12"Øx5'-0"
	Holding power in ordinary soil, (pounds)		8,000		10,000		12,000		16,000

LOG ANCHOR ASSEMBLY

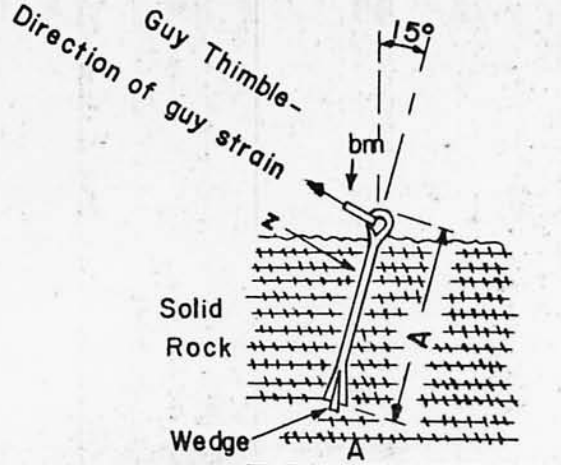
MAY 15, 1973

F2-1 To F2-4



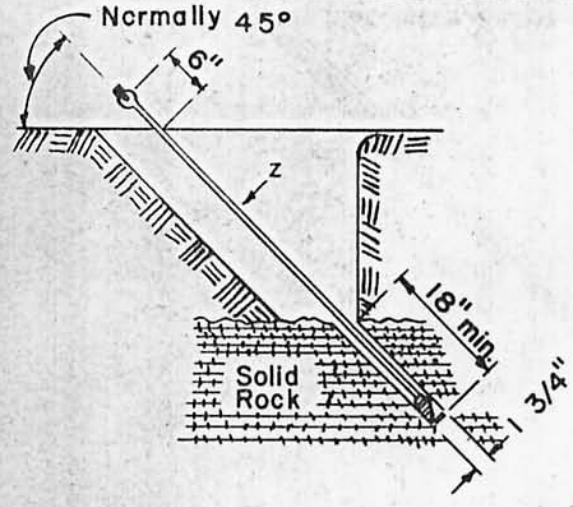
18" min. for sound solid rock
30" min. for stratified rock

F5 - 1



Guy Bolt 18"
Rock Anchor 15"

F5 - 2



F5 - 3

NOTE:

1. Only one guy shall be attached to a rock anchor. Where more than one guy is required space anchors 2 ft. minimum and where practical they shall be in direct line with pole.

2. Do not anchor to any boulder measuring less than 5 ft. in two directions at right angles to each other

		ASSEMBLY UNIT			
		F5 - 1	F5 - 2	F5 - 3	
ITEM	MATERIAL	No. Required	No. Required	No. Required	
x	Rod, anchor or thimble type	1			
z	Anchor, rock		1	1	
bm	Thimble, guy		1		

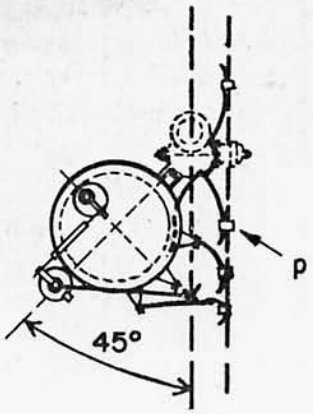
ROCK ANCHOR ASSEMBLIES

MAY 15, 1973

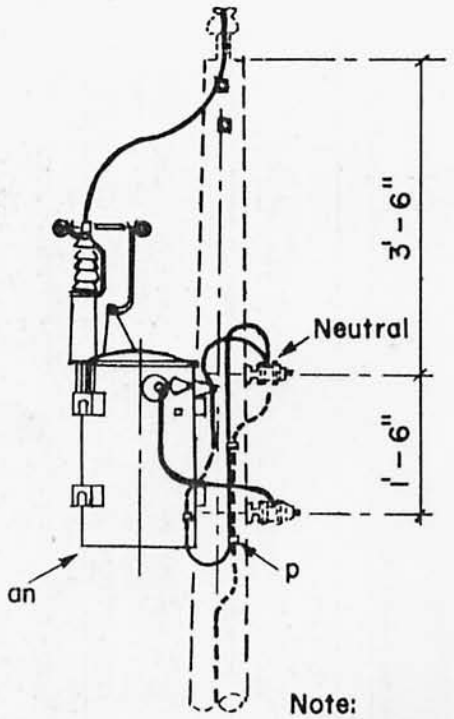
F5-1, F5-2, F5-3

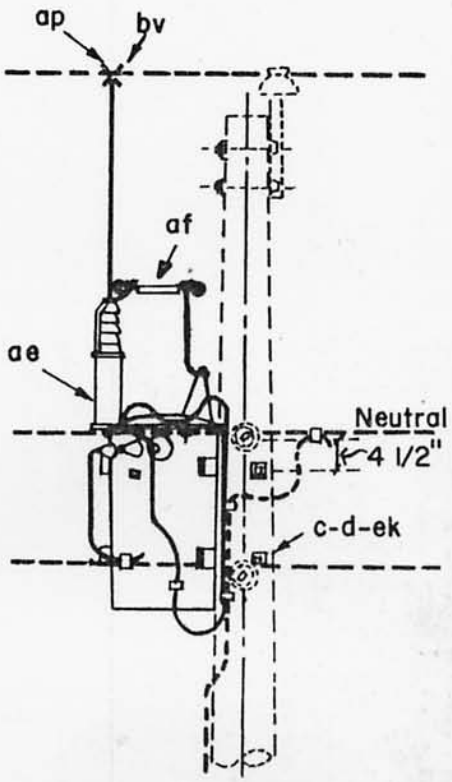
Notes:

1. Designate G9 for conventional transformer with tank mounted cutout and arrester, G65 for transformer with double gap and internal fuse, G105 for self protected transformer.
2. See guide drawings for details of transformer secondary and service connections (M27, M27-1, M27-2, M28).
3. Tap Saddle may be used in lieu of Tapping Armor Rod.



PLAN





Note:
Item ax may be substituted for items ae and af.
(ax- cutout and arrester combination, M5-10

* Conductor Accessories

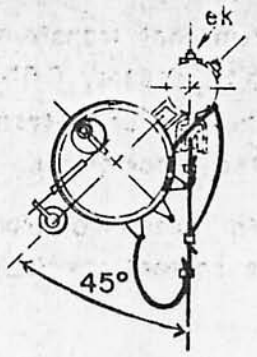
ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
c	2	Bolt machine, 5/8" x 10"	an	1	Transformer, pole type
d	2	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16 hole	ap	1	Clamp, hot line
p	4	Connectors, Compression	aq	1 M	Jumper, primary, #4 ACSR
ae	1	Lightning arrester (G9 only)	aq	2M	Jumper, secondary, Insulated
af	1	Cutout, fuse, open link (G9 only)	ek	2	Locknuts 5/8"
p	1	Connector, split bolt	bv	1	Armor rod, Tapping *
ag	6'	Grounding wire, #4 AWG, 3 strand Al. Alloy			

7.62/13.2 KV. SINGLE PHASE TRANSFORMER AT 1-PHASE TANGENT

NOTE: M-Length in meters

MAY 15, 1973

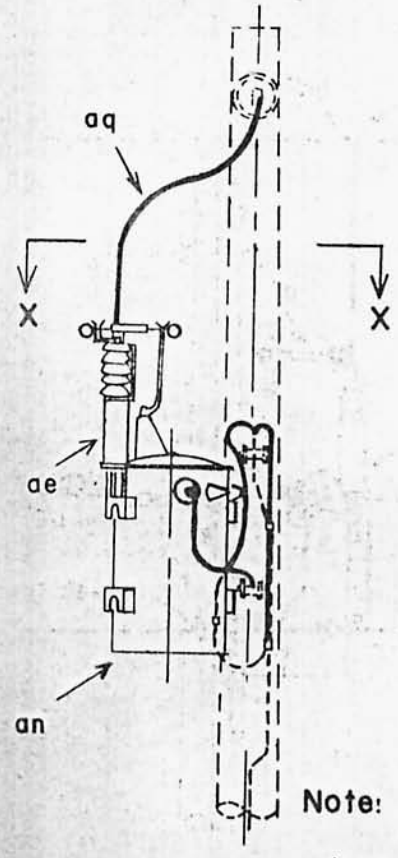
G9, G65, G105

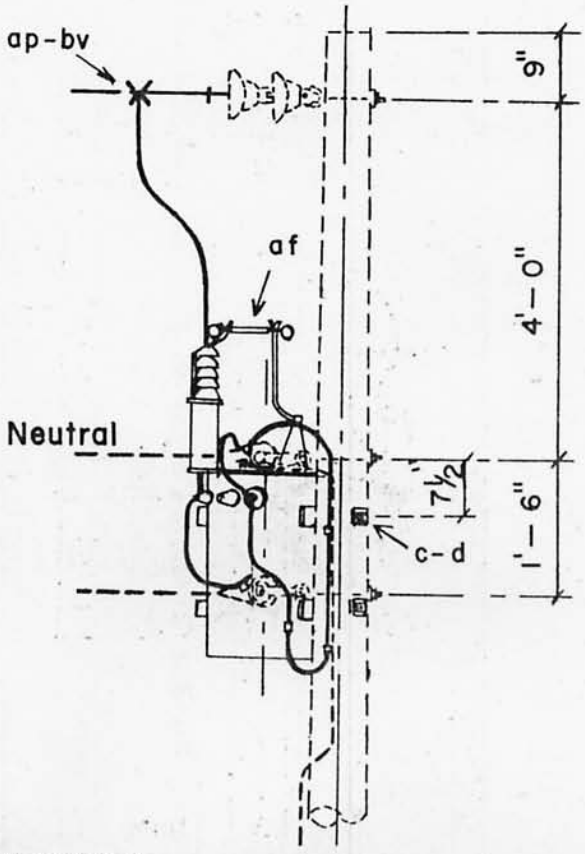


Notes:

1. Designate G10 for conventional transformer with tank mounted cutout and arrester, G66 for transformer with double gaps and internal fuse, G106 for self protected transformer.
2. See guide drawings for details of transformer secondary and service connections. (M27, M27-1, M27-2, M28)
3. Tap Saddle may be used in lieu of Tapping Armor Rod.

SECTION X-X





Note:

Item ax may be substituted for items ae and af.
(ax- cutout and arrester combination, M5-10

* Conductor Accessories

ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
c	2	Bolt, machine, 5/8" x 10"	an	1	Transformer, pole type
d	2	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16" hole	ap	1	Clamp, hot line
p	3	Connector compression	aq	1M	Jumper, primary, #4 ACSR
p	1	Connector, split bolt	aq	2M	Jumper, secondary, Insulated
ae	1	Lightning arrester (G10 only)	ek	2	Locknuts 5/8"
af	1	Cutout, fuse, open link (G10 only)	ag	6'	Grounding wire #4 AWG 3strand, Al. Alloy
bv	1	Armor rod tapping *			

NOTE: M - Length in meters

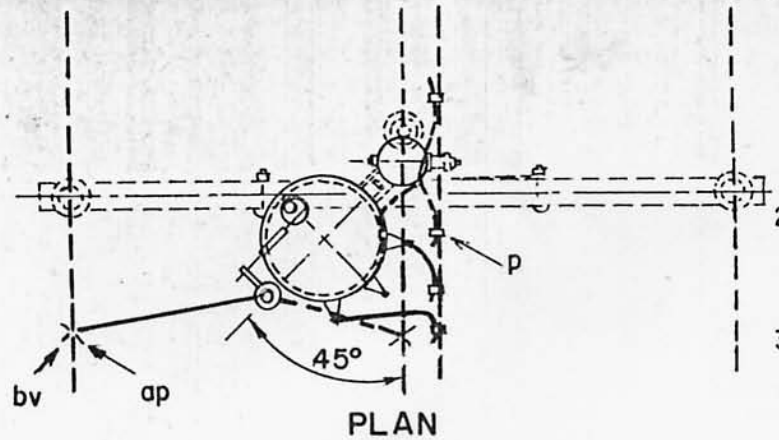
7.62/13.2 KV. SINGLE PHASE TRANSFORMER AT DEADEND

MAY 15, 1973

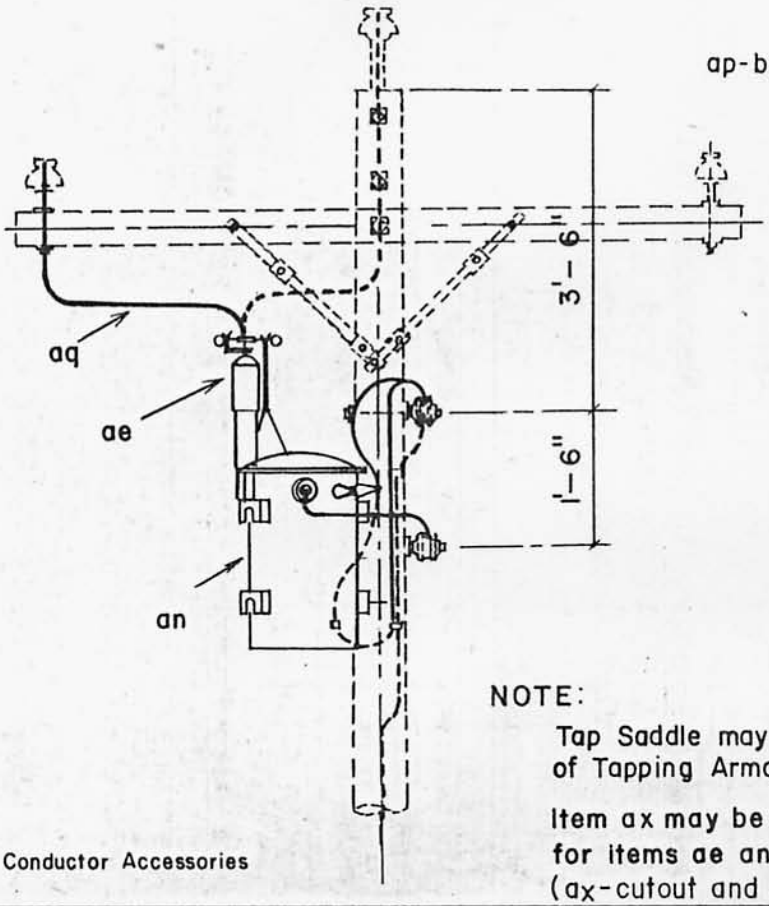
G10, G66, G106

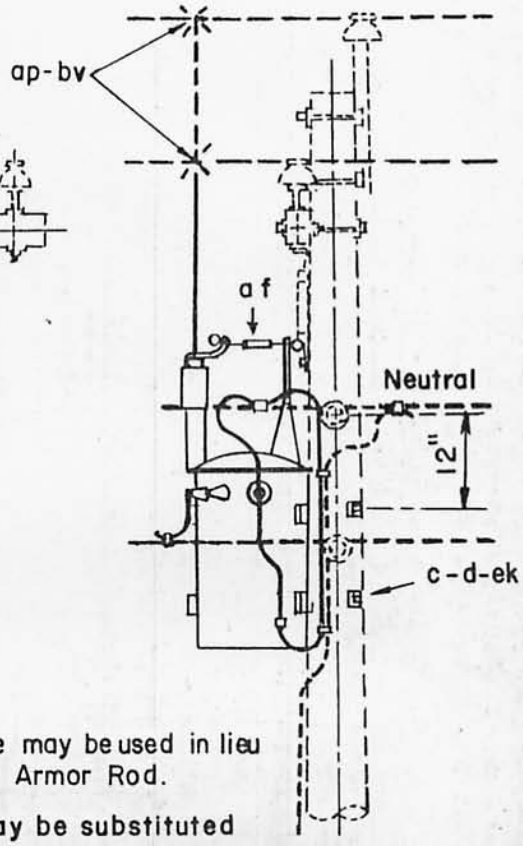
Notes:

1. Designate G39 for conventional transformer with tank mounted cutout and arrester, G67 for transformer with double gap and internal fuse and G136 for self protected transformer.
2. See guide drawings for details of transformer secondary and service connections. (M27, M27-1, M27-2, M28)
3. Reverse for connection to other outside phase.



PLAN





NOTE:

Tap Saddle may be used in lieu of Tapping Armor Rod.

Item ax may be substituted for items ae and af.
(ax-cutout and arrester combination, M5-10)

* Conductor Accessories

ITEM	NO.	MATERIAL
c	2	Bolt, machine, 5/8" x 12"
d	2	Washer, 2 1/4" x 2 1/4 x 3/16", 13/16" hole
p	4	Connectors, Compression
an	1	Transformer, pole type
ap	1	Clamp, hot line
p	1	Connector, split bolt
ag	6'	Grounding wire, #4 AWG 3strand Al. alloy

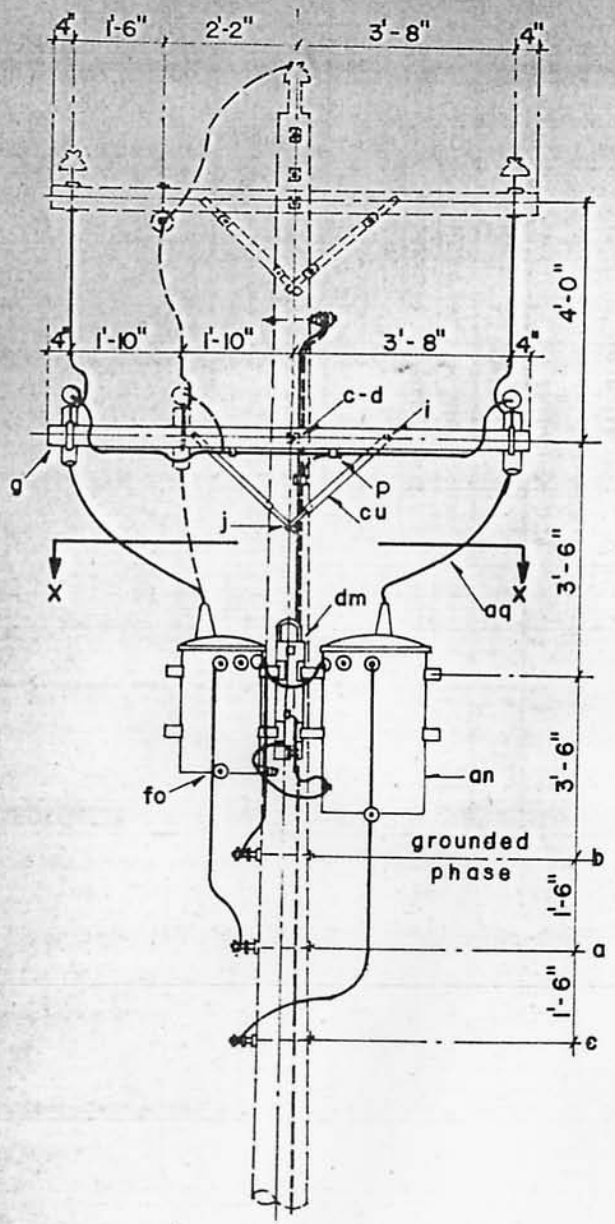
ITEM	NO.	MATERIAL
aq	1M	Jumper, primary, #4 ACSR
aq	2M	Jumper, Secondary, Insulated
af	1	Cutout, fuse, open link (G 39 only)
ae	1	Lightning arrester (G 39 only)
ek	2	Locknuts 5/8"
bv	1	Armor rod, tapping *

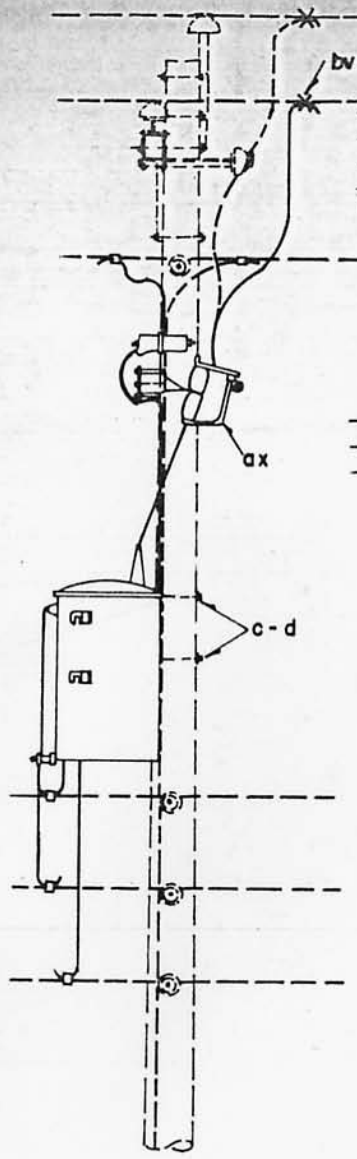
NOTE: M- Length in meters

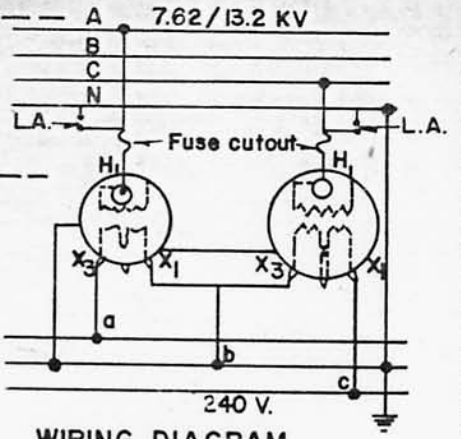
7.62/13.2 KV SINGLE PHASE TRANSFORMER ON THREE PHASE CIRCUIT

MAY 15, 1973

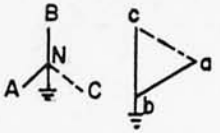
G39, G67, G136

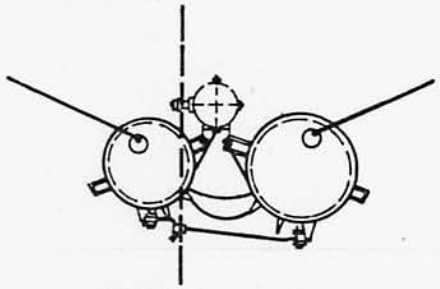






WIRING DIAGRAM





SECTION X-X

Item	No.	Material
c	3	Bolt, machine, 5/8" x 14"
d	4	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16" Hole
g	1	Crossarm, 3 5/8" x 4 5/8" x 8'-0"
i	2	Bolt, carriage, 3/8" x 4 1/2"
j	1	Screw, lag, 1/2" x 4"
p	3	Conn. compression
p	5	Conn. split bolt
an	2	Transformers, conventional, 25 kva max
aq	15M	Jumper, secondary, insulated
aq	10M	Jumper, primary, #4ACSR
ap	2	Clamp, hot line
ax	2	Cutout arrester, combination
cu	2	Brace, wood, 28"
dm	1	Bracket transformer
ek	3	Locknuts, 5/8"
ek	2	Locknuts, 3/8"
cm	3	Spool Insulator, 1 3/4" dia. groove
bv	2	Armor rod, tapping *
aq	20	Grounding wire #4 AWG, 3 strand, al. alloy
fo	3	Transformer, secondary bracket
al	30	Ground wire staple

NOTE: M - Length in meters.

* Conductor Accessories

Tap Saddle may be used in lieu of Tapping Armor Rod.

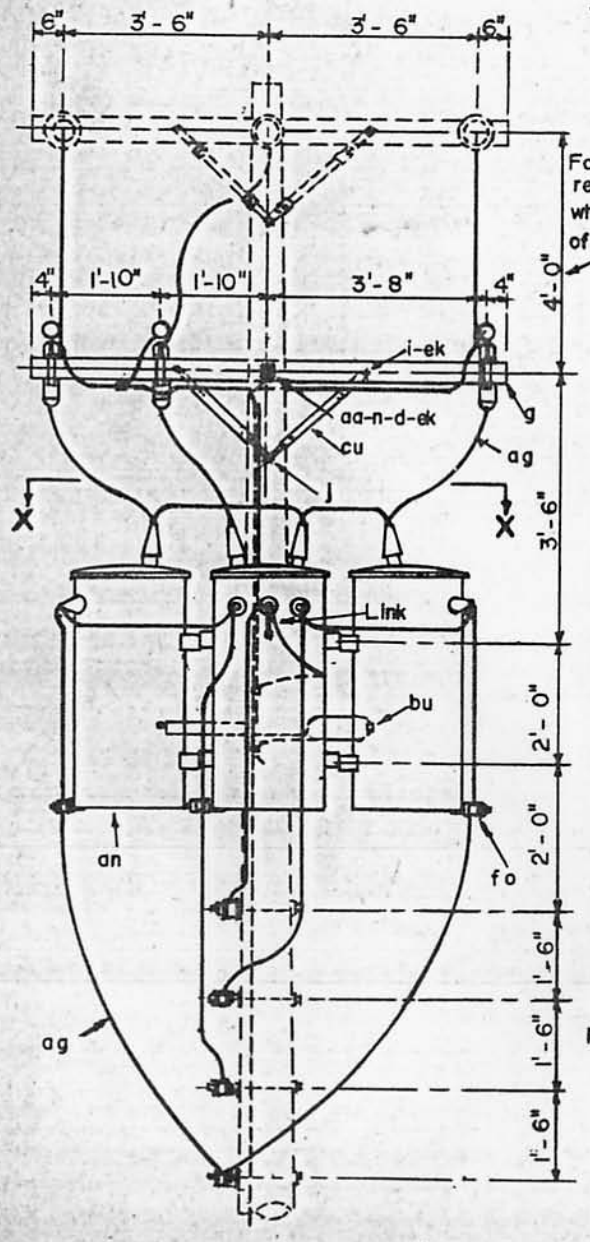
7.62 / 13.2 KV TWO TRANSFORMERS, CLUSTER MOUNTED OPEN WYE-OPEN DELTA FOR 240 VOLT POWER LOADS CORNER GROUNDED

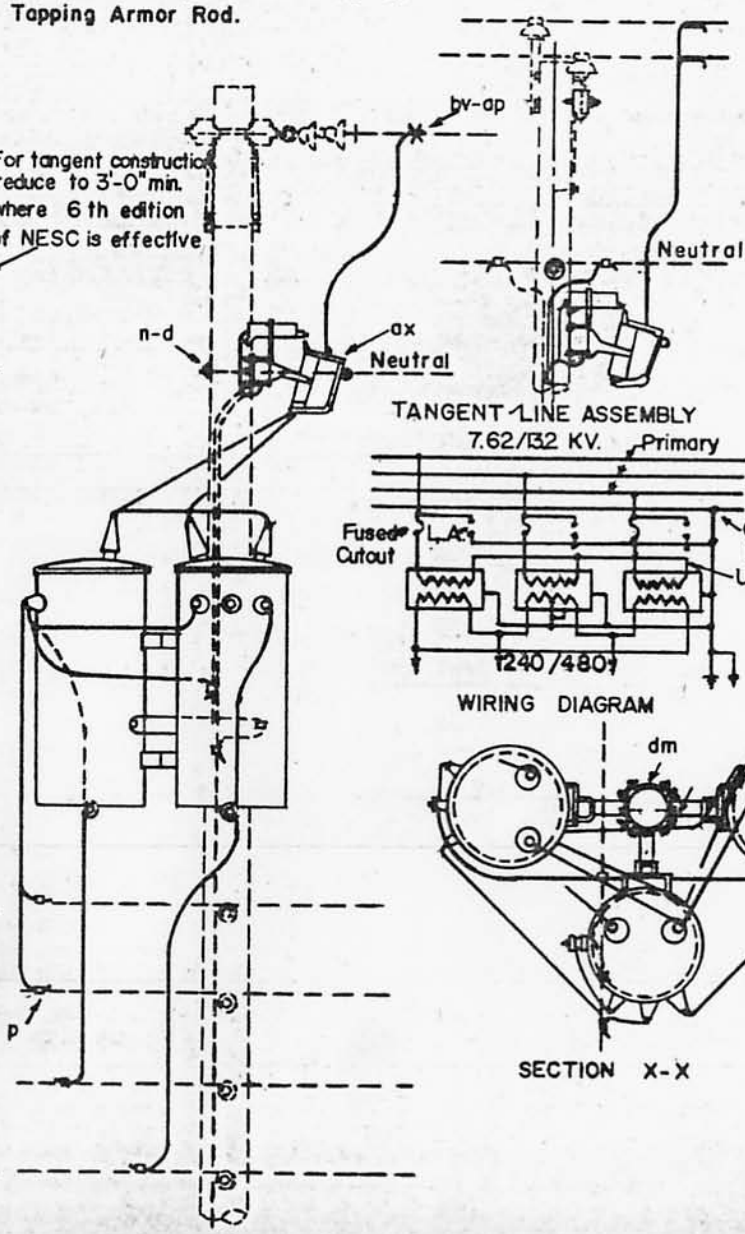
Sept. 15, 1974

G210-

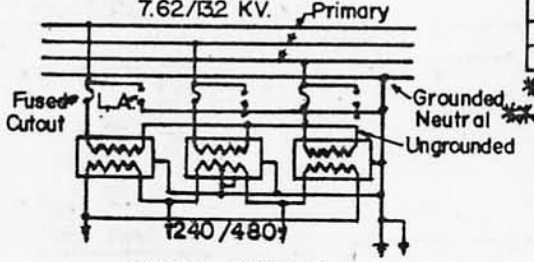
NOTE:

Tap Saddle may be used in lieu of Tapping Armor Rod.

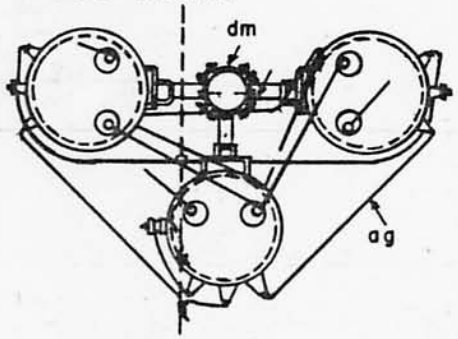




TANGENT LINE ASSEMBLY



WIRING DIAGRAM



SECTION X-X

ITEM	NO.	MATERIAL
d	2	Washer, 2 1/4" x 2 1/4" x 13/16", 13/16" hole
g	1	Crossarm, 3 1/2" x 4 1/2" x 8'-0"
l	2	bolt, carriage, 3/8" x 1/2"
j	4	Screw, lag, 1/2" x 4"
p	3	Connector, compression type
an	3	Transformer, 100 kvg. max. conv.
aq	[illegible]	Jumpers, sec., insulated
p	2	Connector, split bolt
aq	[illegible]	Jumpers, primary, bare, # 4ACSR
ax	3	Cutout and arrester, comb.
bu	4	Connector, solderless *
cc	1	Deadend, assembly, neutral
cu	2	Brace, wood, 28"
dm	1	Bracket, transformer, cluster and adapter plates through bolt type
	1	Link, grounding
ag	6'	Grounding wire, # 4AWG 3str. alum. alloy
fo	3	Transformer sec. bracket
n	1	Bolt, double arming, 5/8" x 18"
ap	3	Connector, hot line
ek	2	Lockknuts, 5/8"
ek	2	Locknuts, 3/8"
cm	3	Spool insulator, 1 3/4" dia. groove
bv	3	Armor rod, tapping *

* Conductor Accessories
** Specify this item to be furnished by transformer manufacturer.

M-length in meters

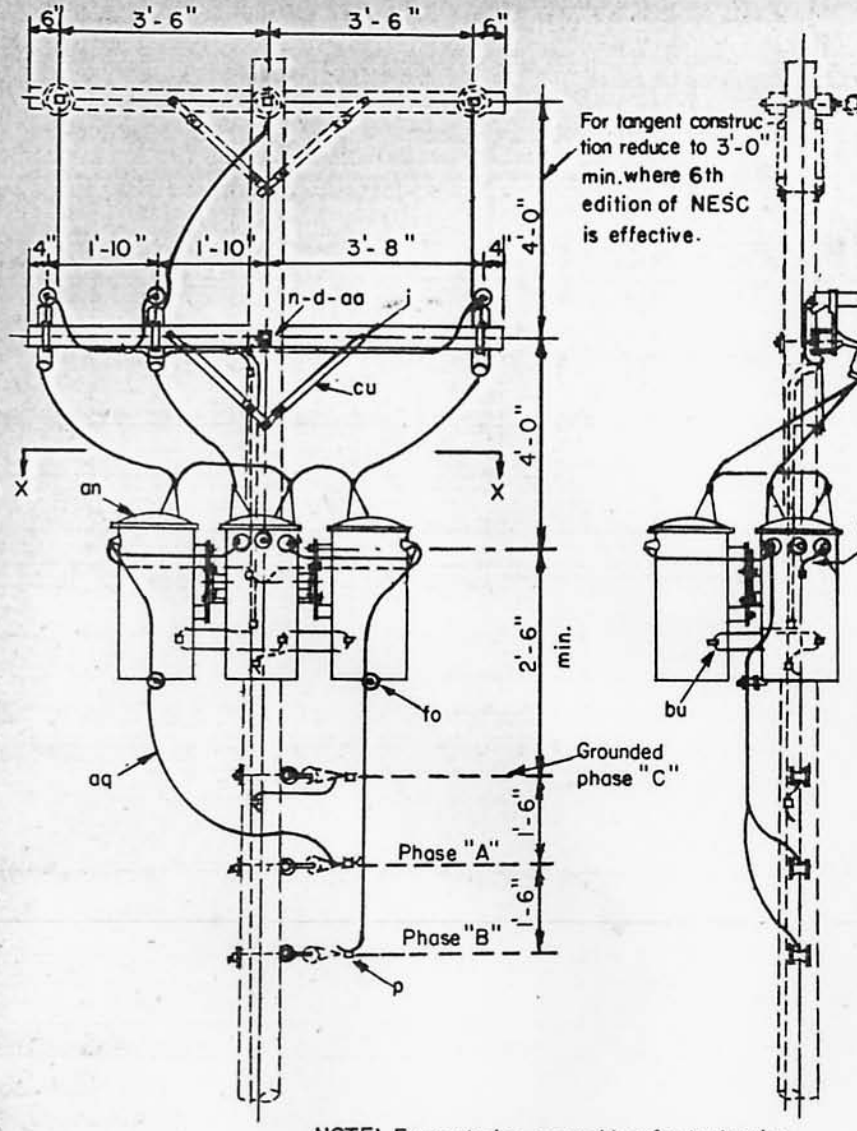
Notes:

1. All tanks to be grounded.
2. Secondary neutrals of all transformers except one shall be disconnected from tanks and not grounded.
3. When used for combined 1-phase and 3-phase load the transformer for the 1-phase load shall not be larger than twice the capacity of one of the others
4. For transformers 25 kva and smaller, use cluster bracket with adopter plates and dimension as shown on G311.
5. Also 120/240 Volt.

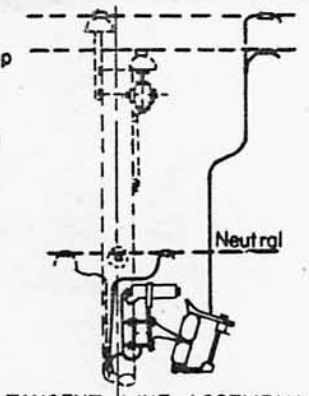
7.62/13.2 KV.
THREE TRANSFORMERS CLUSTER MOUNTED
UNGROUNDED WYE DELTA FOR
240/480 VOLT POWER LOADS

May 15, 1973

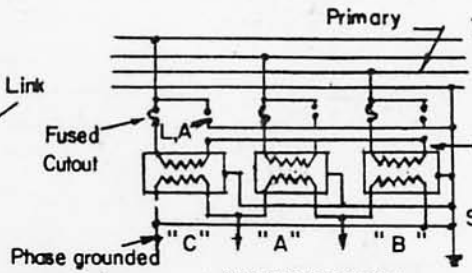
G310



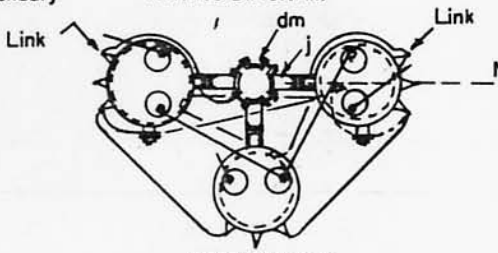
NOTE: For metering assembly, refer to drawing M8-12
Tap Saddle may be used in lieu of Tapping Armor Rod.



TANGENT LINE ASSEMBLY



WIRING DIAGRAM



SECTION X-X

ITEM	NO. REQ'D.	MATERIAL
d	2	Washer, 2 1/4"x 2 1/4"x 3/16", 13/16" ho
g	1	Crossarm, 3 1/2"x 4 1/2"x 8'-0"
i	2	Bolt, carriage, 3/8"x 4 1/2"
j	4	Screw, lag, 1/2"x 4"
n	4	Bolt, double arming, 5/8"x req'd
p	3	Connectors, compression type
p	3	Connectors, split bolt
ap	3	Connector, hotline
an	3	Transformer, 100 KVA max -
aq	12 M	Jumper, primary bare, ACSR #4
aq	15 M	Jumper, secondary, Insulated
ax	3	Cutout and Arrester, combination
cu	2	Brace, wood, 28"
fo	2	Transformer secondary bracket
bu	5	Connector, solderless **
dm		Bracket, transformer, cluster and adapter plates, as req'd
	2	Link grounding **
ek	2	Locknuts 3/8"
ek	2	Locknuts 5/8"
aq	6'	Grounding Wire* 4 AWG, 5005 Aluminum Alloy
bv	3	Armor Rod (tapping) *
cm	3	Spool Insulator 1 3/4" groove

* Conductor Accessories
** Specify these items to be furnished by the manufacturer.

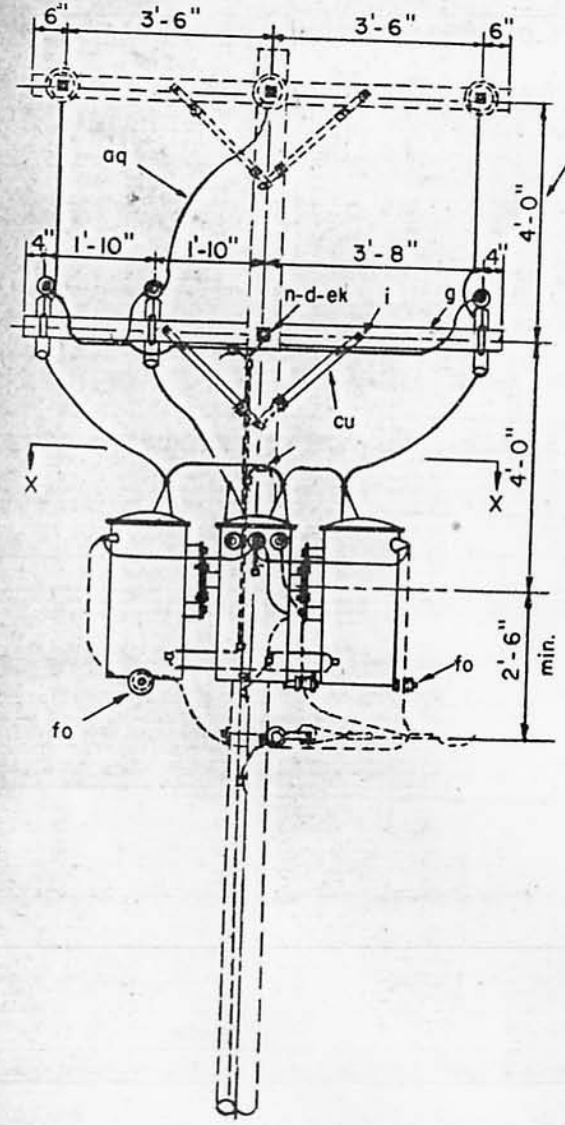
NOTES:

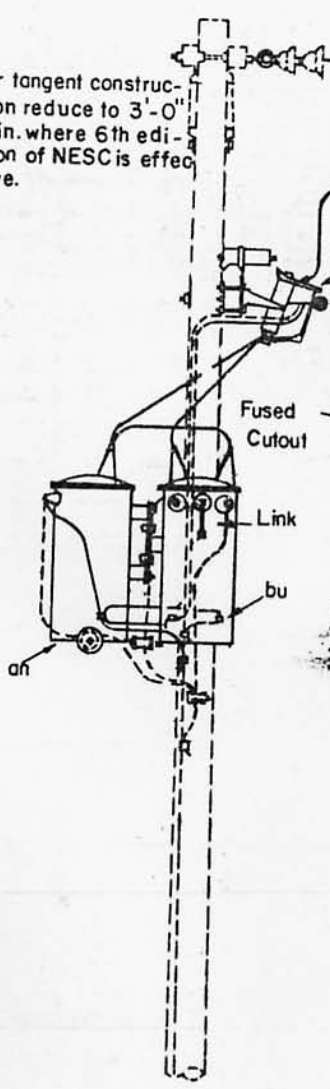
1. All tanks to be grounded
2. Secondary neutrals shall be disconnected from tanks and not grounded.
3. Grounded secondary phase wire must be identified throughout circuit run
4. For transformers 37 1/2 KVA and larger, use two cluster brackets and dimension as shown on G310
5. M, length in meters

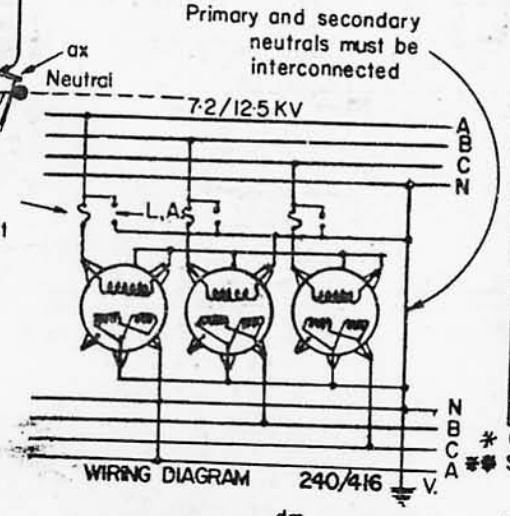
7.62/13.2 KV THREE TRANSFORMERS, CLUSTER MOUNTED 3 WIRE GROUNDED DELTA FOR 240 OR 480V POWER LOADS

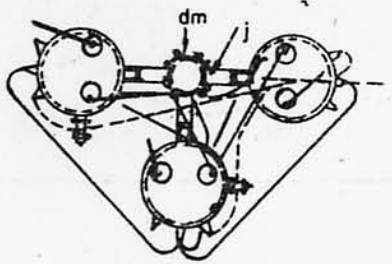
MAY 15, 1973

G 311









SECTION X-X

	NO.	MATERIAL
d	2	Washer, 2 1/4"x2 1/4"x 3/16, 13/16 hole
g	1	Crossarm, 3 1/2" x 4 1/2" x 8'-0"
i	2	Bolt, carriage, 3/8" x 4 1/2"
l	4	Screw, lag, 1/2" x 4"
n	1	Bolt, double, arming, 5/8" x req'd lenght
p	3	Connector, compression type
p	3	Connectors, split bolt
ap	3	Connector, hotline
an	3	Transformer, 100 KVA max
aq	15 M	Jumper, secondary, Insulated
aq	12 M	Jumper, primary, bare #4 ACSR
ax	3	Cutout and arrester, combination
bu	3	Connector, solderless **
cu	2	Brace, wood, 28"
dm		Bracket, transformer, cluster and adapter plates as required
fo	3	Transformer secondary bracket
	3	Link grounding **
ek	2	Locknuts 3/8"
ek	2	Locknuts 5/8"
aq	6'	Ground wire, #4 AWG, 5005 Al. Alloy
bv	3	Armor rod (tapping) *
cm	3	Spool, insul. 1 3/4" dia. groove

* Conductor Accessories

** Specify these items to be furnished by the manufacturer.

NOTES:

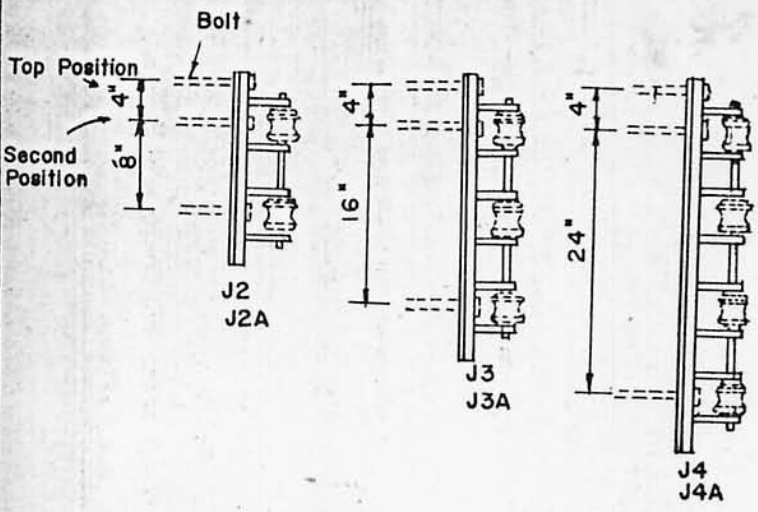
1. For transformers 37 1/2 KVA and larger, use two cluster brackets and dimensions as shown on G310.
2. Single bushing transformers may be used if desired.
3. Re-connect internal windings of secondary as shown.
4. Also for 120/208 Volts.

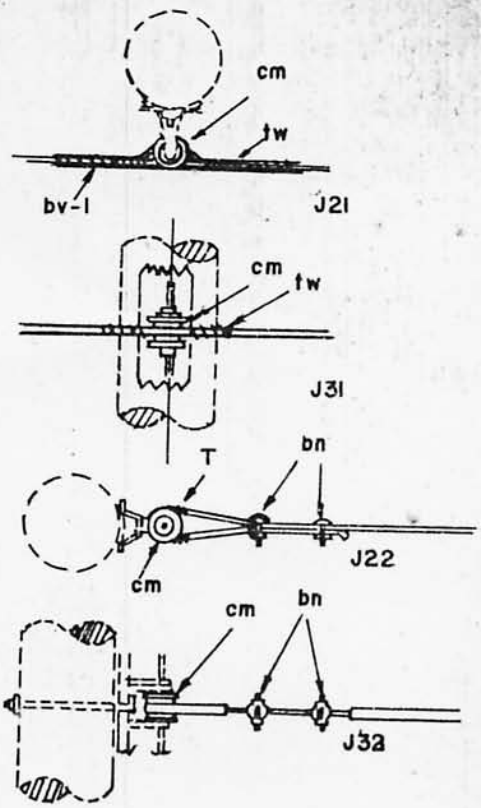
Note: For metering, see drawing M8-11
Tap Saddle may be used in lieu of Tapping Armor Rod.

7.62/13.2 KV THREE TRANSFORMERS, CLUSTER MOUNTED FOUR WIRE GROUNDED WYE GROUNDED WYE FOR 240/416 VOLT POWER LOADS

MAY 15, 1973

G 312





Note:

Top bolt position for tangent secondary

Second bolt position for deadend secondary

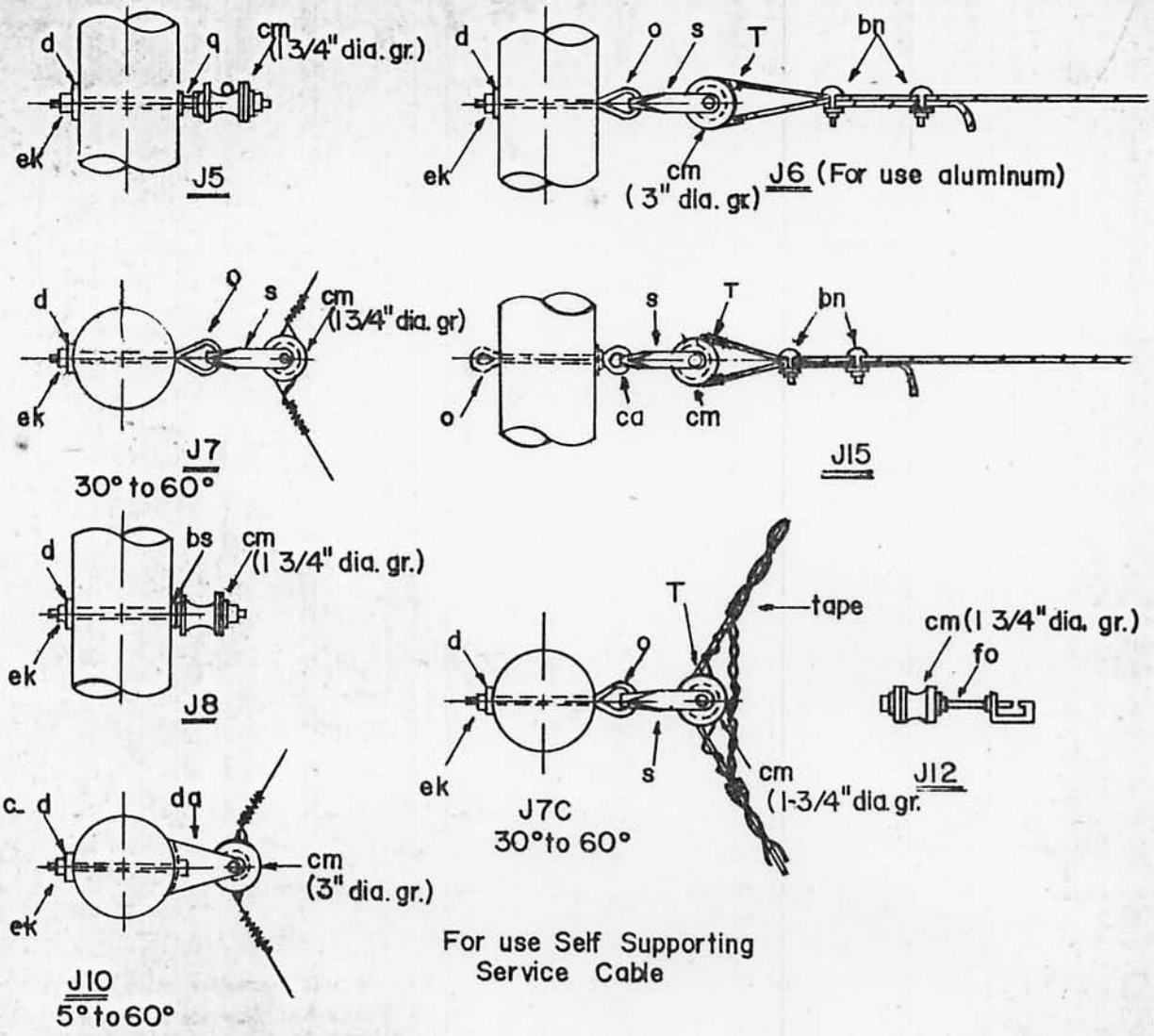
		ASSEMBLY UNIT									
		WITH BOLTS			WITHOUT BOLTS			BARE CONDUCTOR		INSULATED COND.	
ITEM	MATERIAL	J2	J3	J4	J2A	J3A	J4A	J21	J22	J31	J32
	2' Wire Rack	1			1						
	3 Wire Rack		1			1					
	4 Wire Rack			1			1				
c	Bolt, Mach. 5/8" x 9"	2	2	2							
d	Washer, sq. 2 1/4" x 2 1/4" x 3/16", 13/16" hole	2	2	2							
ek	Locknut 5/8"	2	2	2							
cm	Spool Insl. 1 3/4" dia.gr.							1	1	1	1
bv-1	Armor rod (single sup.) *							1			
tw	Tire wire *							4'		4'	
T	Armor tape *								1'		
bn	Clamp, loop deadend								2		2

* CONDUCTOR ACCESSORIES

SECONDARY RACK ASSEMBLIES

May 15, 1973

J2, J3, J4, J21, J22, J31, J32



For use Self Supporting Service Cable

Note:

On ACSR conductor
use Armor Tape for J6, J7C
use Armor Rod for J5, J7, J8, J10

* Conductor Accessories

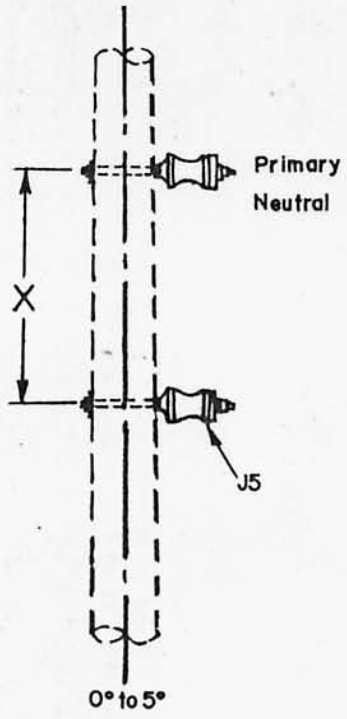
ITEM	NO.	MATERIAL
c		Bolt machine, 5/8"x10"
d		Washer, 2 1/4"x2 1/2"x 3/16", 13/16" hole
o		Bolt, eye, 5/8"x 10"
p		Connectors, as required
q		Bolt, double upset, 5/8"x 10"
s		Clevis, secondary, swinging, insulated
cm		Spool insulator, 1 3/4" dia. groove
cm		Spool insulator, 3" dia. groove
bv-1		Armor rod (Single Support) *
TW	4'	Tie wire *
T	1'	Armor tape *
ca		Nut, eye 5/8"

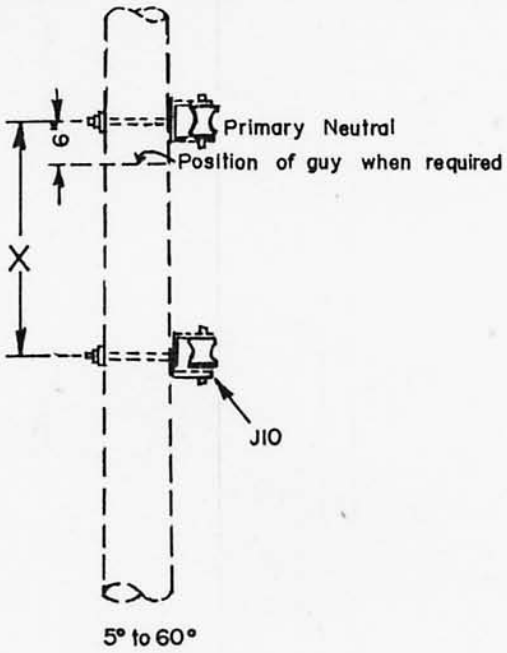
ITEM	NO	MATERIAL
bs		Bolt, single upset 5/8"x10"
bn		Clamp, loop, deadend
cq		Sleeve, offset, splicing
da		Bracket
fo		Transformer secondary bracket
ek		Locknuts, 5/8"

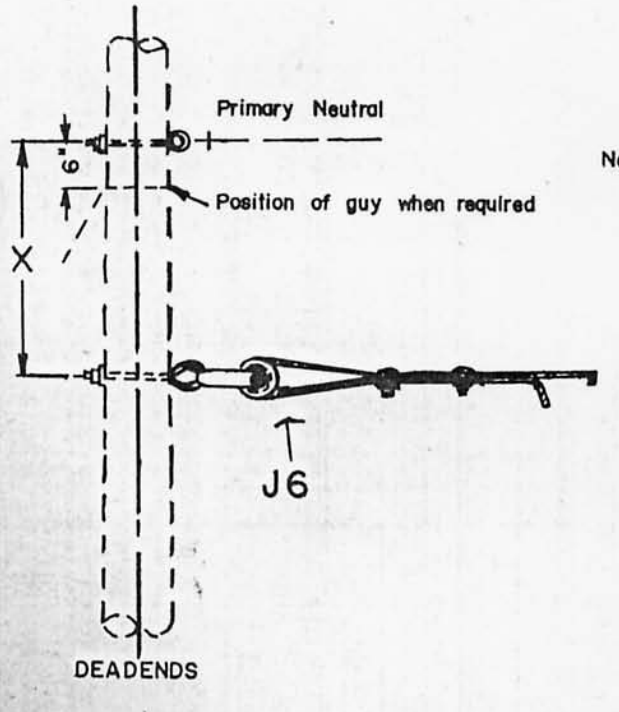
SECONDARY ASSEMBLIES

May 15, 1973

J5 to J15







Note:

X - underbuilt separation

- 18" for # 4 ACSR spans less than 130 meters
- 18" for # 2 ACSR spans less than 152 meters
- 18" for # 1/0 ACSR spans less than 146 meters
- 24" for # 4 ACSR spans 130 to 152 meters
- 24" for # 2 ACSR spans 152 to 200 meters
- 24" for # 1/0 ACSR spans 146 to 198 meters

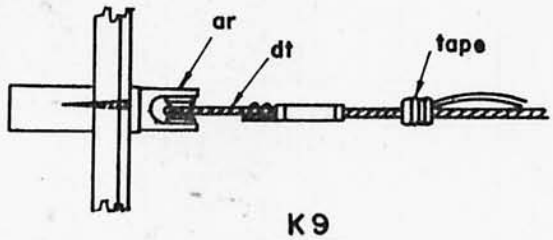
7.62 / 13.2 KV

GUIDE FOR INSTALLATION OF SECONDARY UNDERBUILD

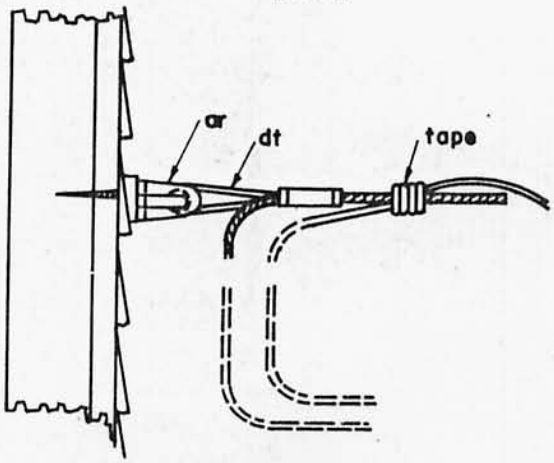
(INCLUDING OPEN WIRE SECONDARY)

May 15, 1973

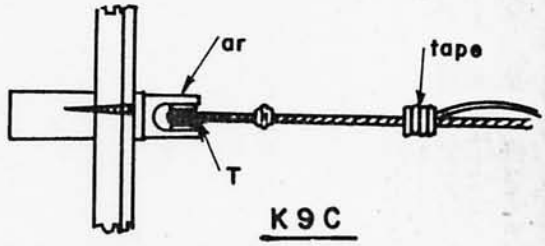
J20



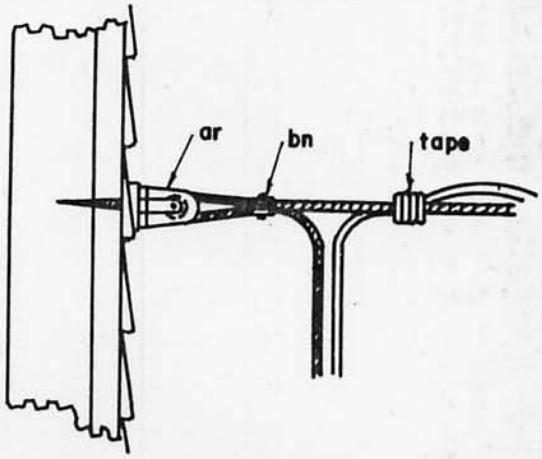
K9



WEDGE TYPE



K9C



LOOP TYPE
(not recommended)

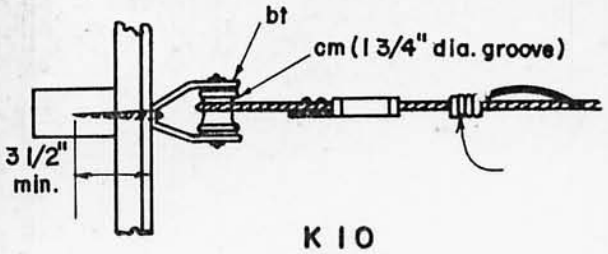
*Conductor Accessories

ITEM	MATERIAL	QUANTITY K9	QUANTITY K9C		
ar	Wireholder	1	1		
dt	Service Deadend, Wedge Type	1			
bn	Clamp, Loop Deadend		1		
T	Armor Tape *		1'		

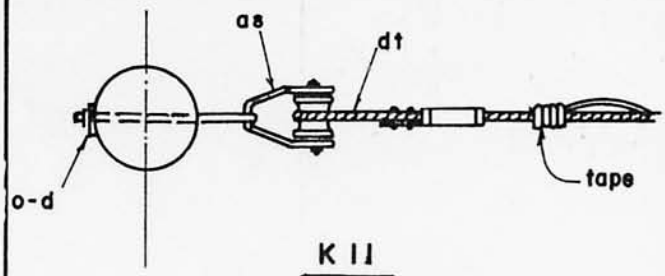
SERVICE ASSEMBLIES

Sept. 15, 1974

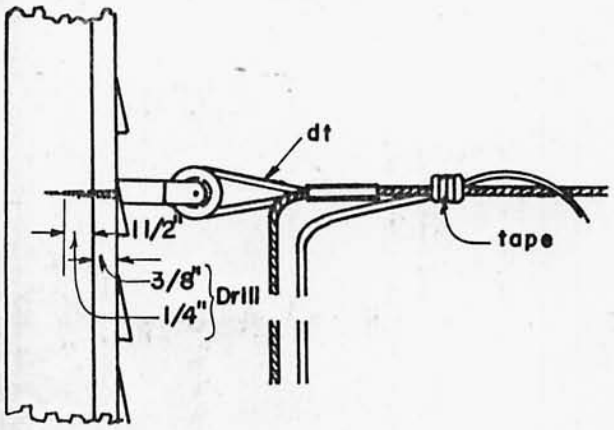
K9, K9C



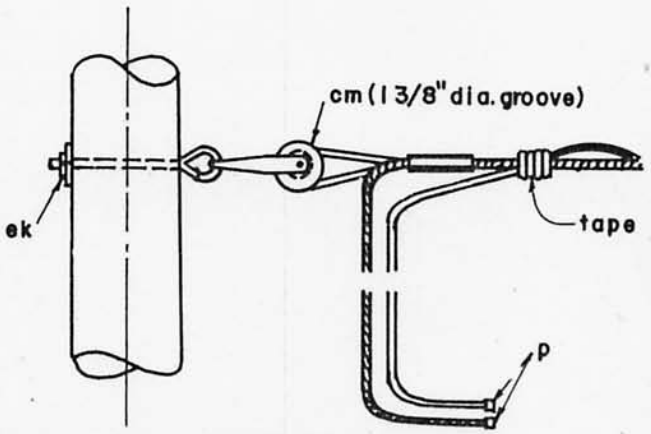
K 10



K 11



WEDGE TYPE



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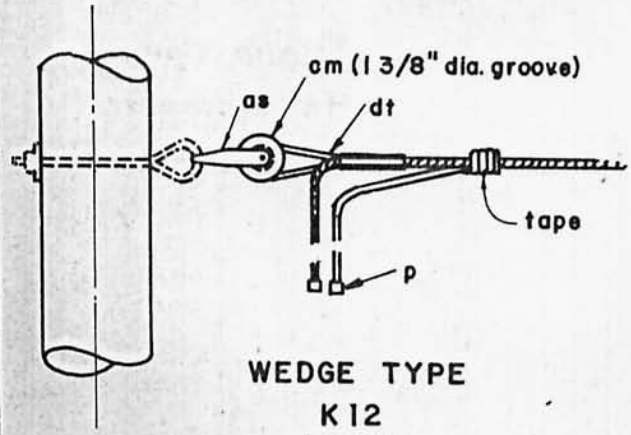
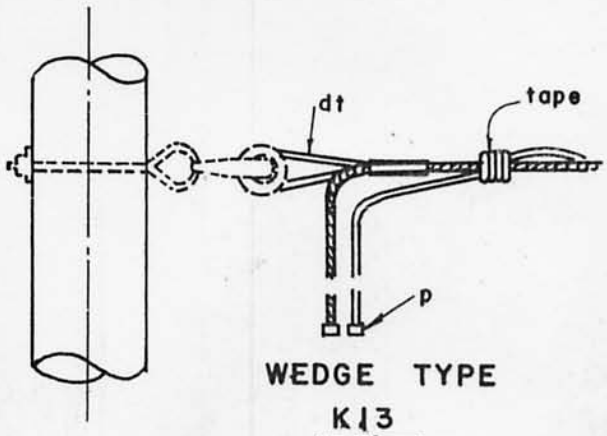


WEDGE TYPE
K12



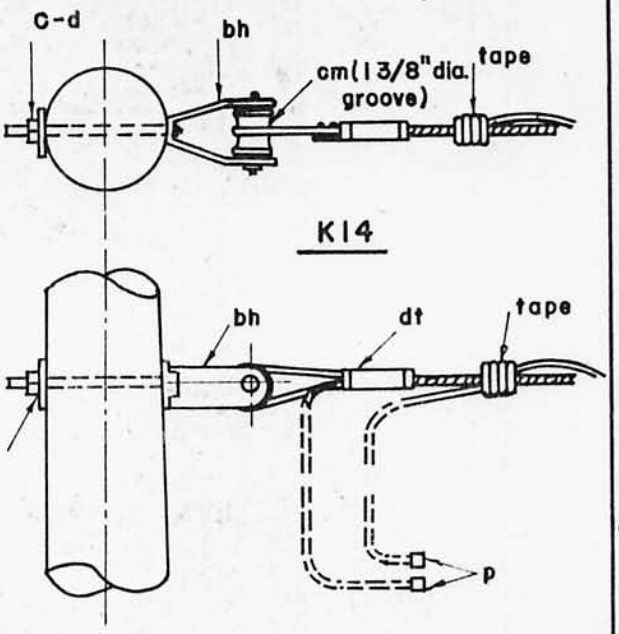
WEDGE TYPE
K13

ITEM	MATERIAL	QUANTITY			
		K10	K11	K12	K13
cm	Spool Insulator, 1 3/8" dia. groove		1	1	
cm	Spool Insulator, 1 3/4" dia. groove	1			
as	Clevis, service, swinging		1	1	
bt	Wireholder, clevis type, #24 woodscrew	1			
dt	Service deadend, wedge type	1	1	1	1
o	Bolt, eye, 5/8" x 9"		1		
d	Washer, 2 1/4" x 2 1/4" x 3/8", 13/16" hole		1		
ek	Locknut, 5/8"		1		
p	Connector, compression		2	2	2

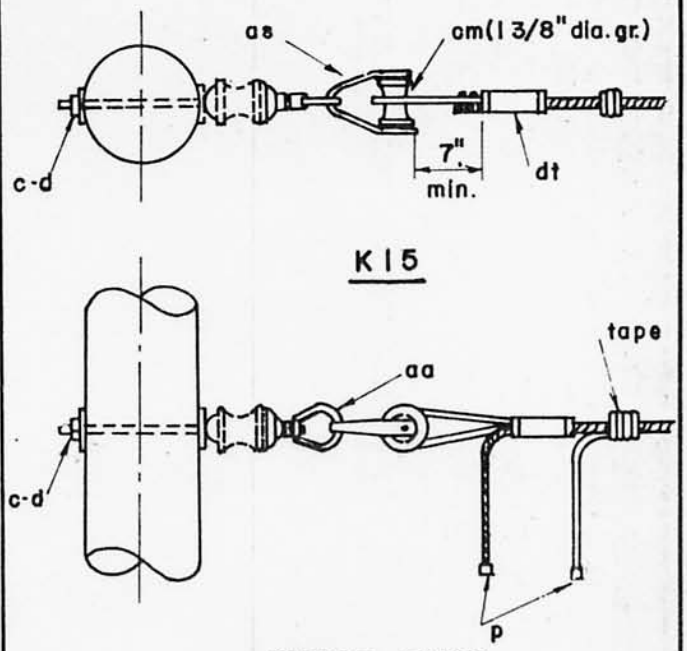
SERVICE ASSEMBLIES

SEPT. 15, 1974

K10, K11, K12, K13



WEDGE TYPE



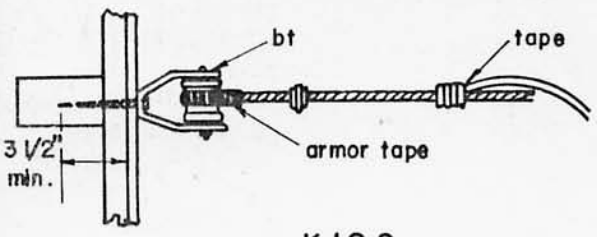
WEDGE TYPE

ITEM	MATERIAL	QUANTITY			
		K14	K15		
c	Bolt, machine, 5/8"x10"	1			
d	Washer, 2 1/4"x2 1/4"x3/8", 13/16" hole	1			
p	Connector, compression	2	2		
ek	Locknut, 5/8"	1			
aa	Nut, Eye 5/8"		1		
bh	Clevis, service, deadend	1			
as	Clevis, service, swinging		1		
dt	Service deadend, wedge type	1	1		
cm	Spool Insulator, 13/8" groove	1	1		

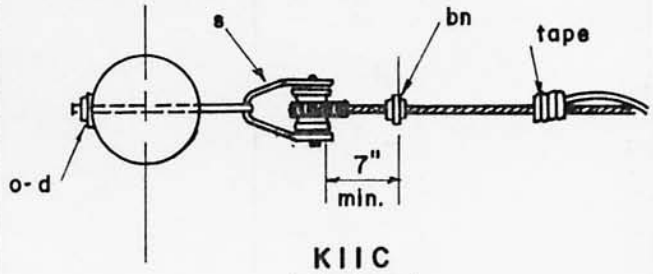
SERVICE ASSEMBLIES

SEPT. 15, 1974

K14, K15

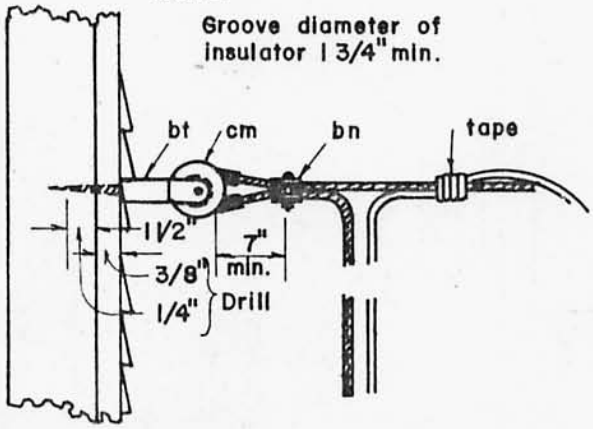


K10C

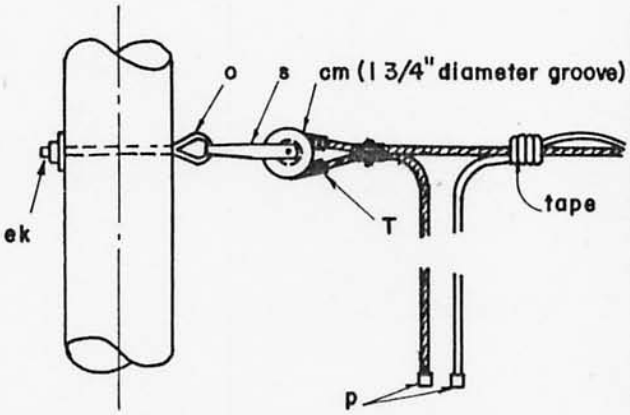


K11C

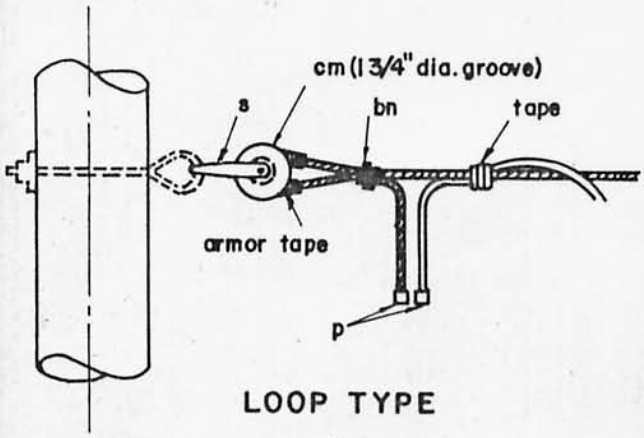
NOTE:
Groove diameter of insulator 1 3/4" min.



LOOP TYPE

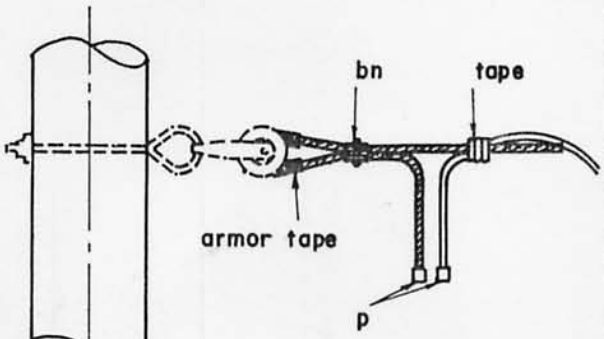


LOOP TYPE



LOOP TYPE

K12C



LOOP TYPE

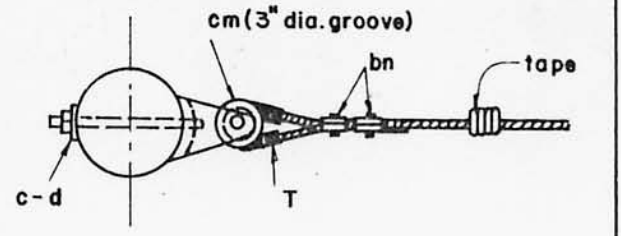
K13C

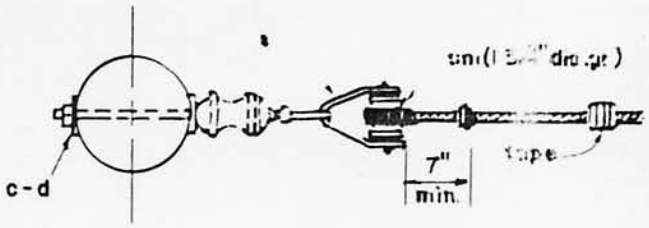
ITEM	MATERIAL	QUANTITY			
		K10C	K11C	K12C	K13C
s	Clevis, Secondary, Swinging		1	1	
o	Bolt, Eye, 5/8" x 9"		1		
p	Connector, Compression		2	2	2
T	Armor Tape *	1'	1'	1'	1'
cm	Spool Insulator, 1 3/4" dia. groove	1	1		
bn	Clamp, Loop Deadend	1	1	1	1
bt	Wireholder, Clevis Type, *24 Woodscrew	1			
ek	Locknut, 5/8"		1		
d	Washer, 2 1/4" x 2 1/4" x 3/8", 13/16" Hole		1		
	*Conductor Accessories				

SERVICE ASSEMBLIES

Sept. 15, 1974

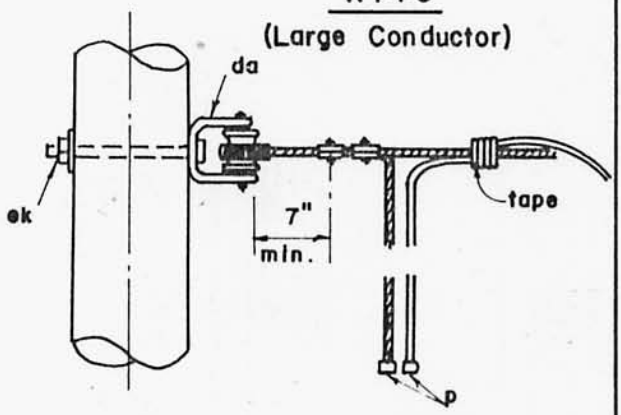
K10C, K11C, K12C, K13C





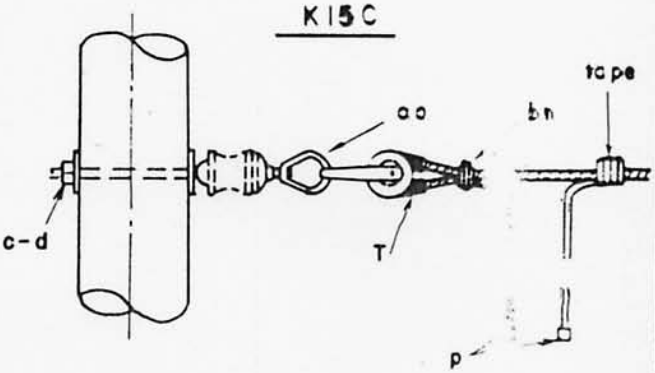
K14C

(Large Conductor)



LOOP TYPE

K15C



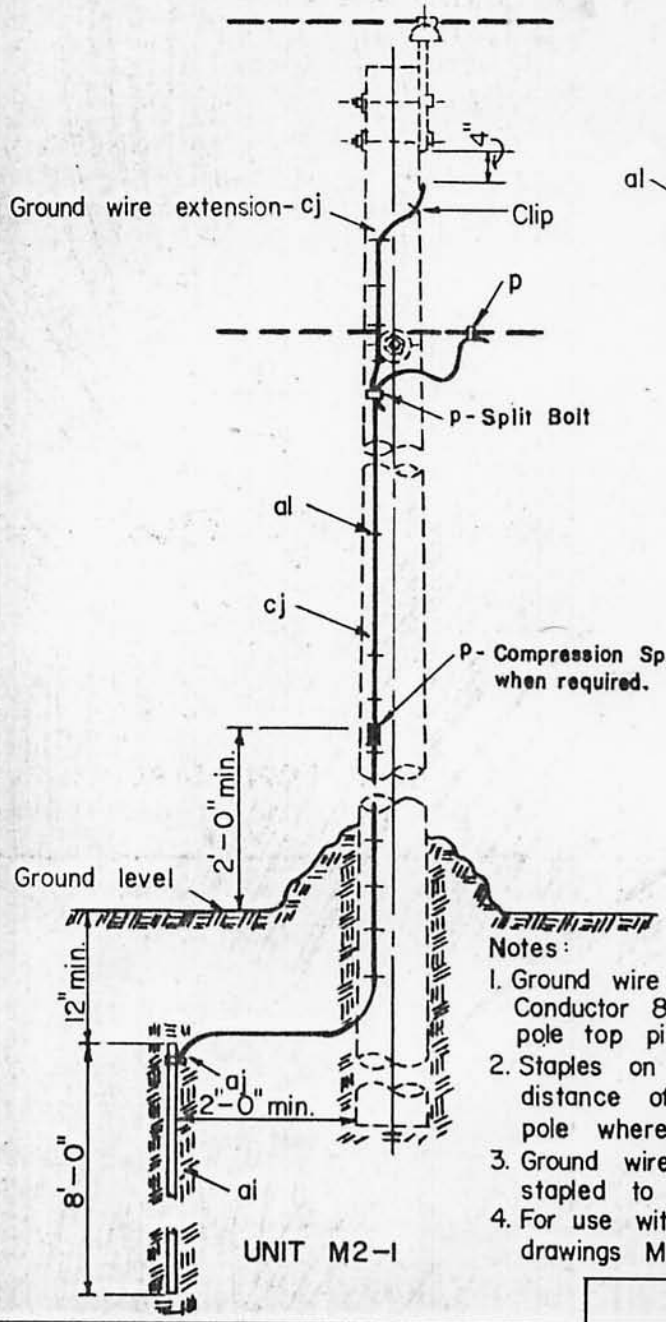
LOOP TYPE

ITEM	MATERIAL	QUANTITY			
		K14C	K15C		
c	Bolt machine, 5/8" x 10"	1			
d	Washer, 2 1/4" x 2 1/4" x 3/8", 13/16" hole	1			
p	Connector, compression	2	2		
s	Clevis, secondary, swinging		1		
T	Armor tape *T	1'	1'		
aa	Nut eye, 5/8"		1		
da	Bracket, secondary	1			
ek	Locknut, 5/8"	1			
cm	Spool Insulator, 3" dia. groove	1			
cm	Spool Insulator, 1 3/4" dia. groove		1		
bn	Clamp, loop deadend	2	1		
	*Conductor Accessories				

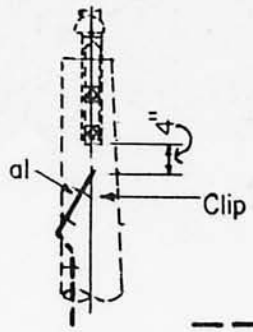
SERVICE ASSEMBLIES

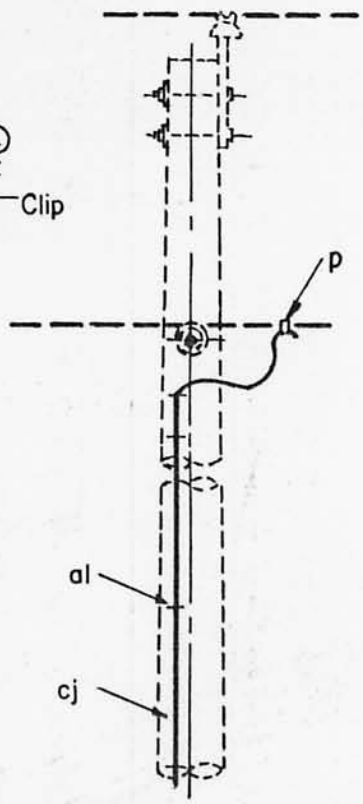
Sept. 15, 1974

K14C, K15C



UNIT M2-I





UNIT M2-II
similar to Unit M2-I except as shown.

Notes:

1. Ground wire to be located on same side as Neutral Conductor & in quadrant opposite climbing space or pole top pin.
2. Staples on ground wire shall be 2'-0" apart, except for a distance of 8'-0" above ground & 8'-0" from top of pole where they shall be 6" apart.
3. Ground wire to clear all hardware by 2" min. & shall be stapled to maintain this position.
4. For use with V & 3-phase assemblies refer to guide drawings M30-1 & M30-2.

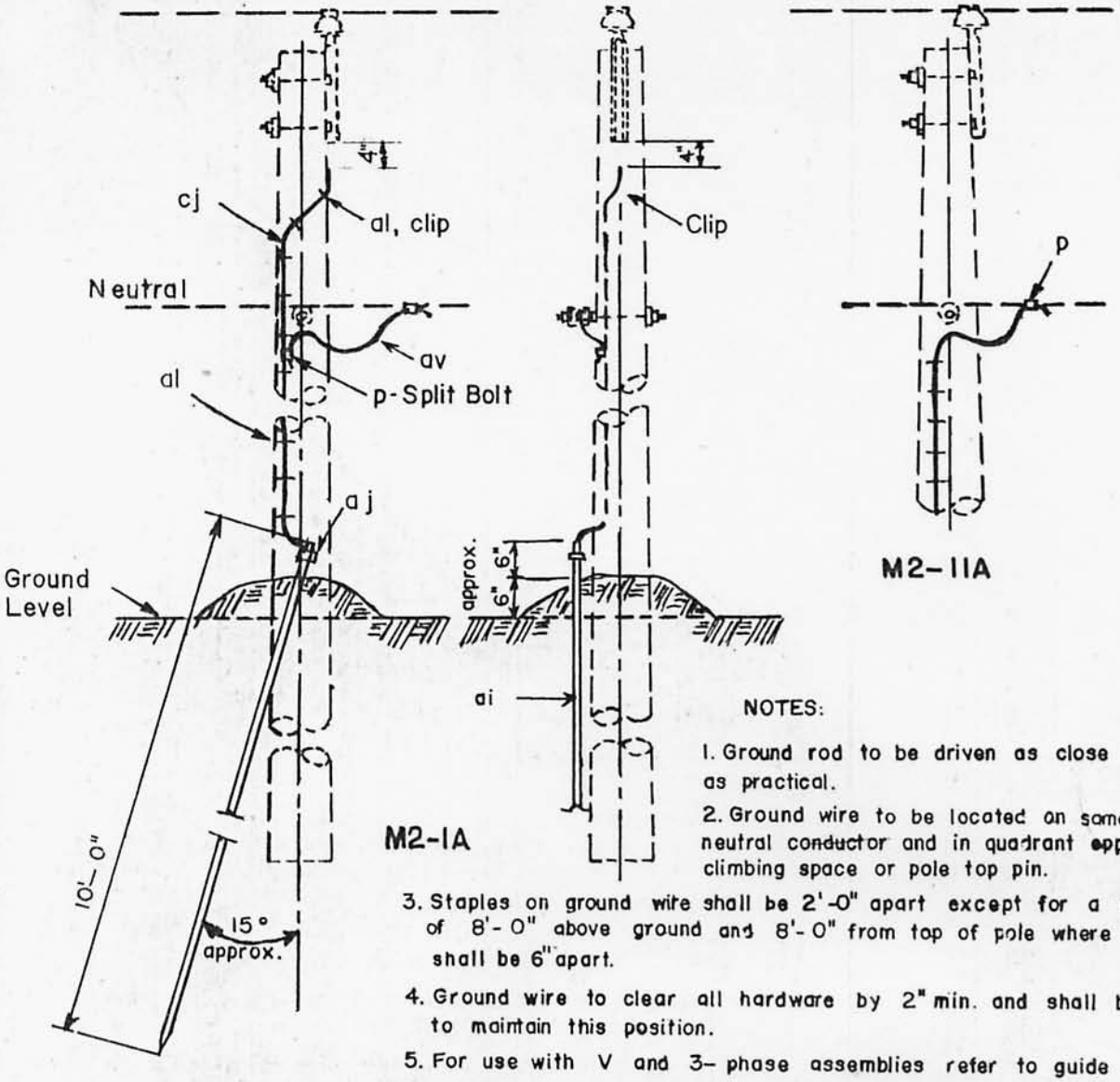
ITEM	MATERIAL	ASSEMBLY UNIT M2-I	ASSEMBLY UNIT M2-II	
p	Connector, split bolt type	1		
ai	Rod, ground, 5/8" dia. x 8' steel	1	1	
aj	Clamp, ground rod for 5/8" steel rod	1	1	
al	Staples, ground wire, 2" x 1/2", # 8 gauge	40	35	
al	Ground wire clip	1		
cj	Ground wire, # 4 AWG 3 strand Al. alloy	3'		
p	Connector, compression	1	1	
cj	Grounding wire, iron, 5/16" dia.	35'	33'	

GROUNDING ASSEMBLY — GROUND ROD TYPE

MAY 15, 1973

Pole Protection

M2-1, M2-11



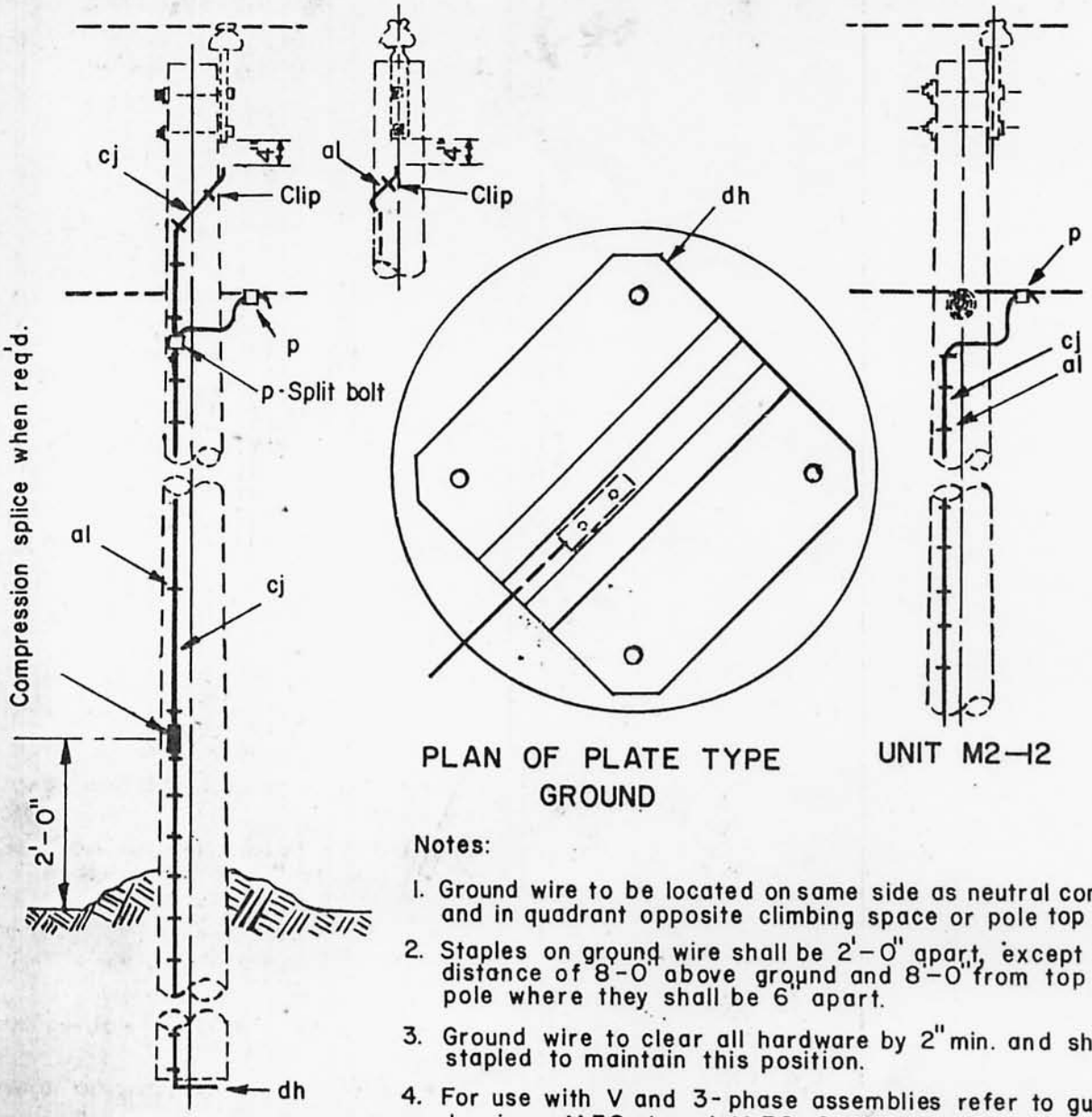
NOTES:

1. Ground rod to be driven as close to pole as practical.
2. Ground wire to be located on same side as neutral conductor and in quadrant opposite climbing space or pole top pin.
3. Staples on ground wire shall be 2'-0" apart except for a distance of 8'-0" above ground and 8'-0" from top of pole where they shall be 6" apart.
4. Ground wire to clear all hardware by 2" min. and shall be stapled to maintain this position.
5. For use with V and 3-phase assemblies refer to guide drawings M30-1 and M30-2.

ITEM	MATERIAL	ASSEMBLY M2-1A	UNIT M2-11A
p	Connectors compression	1	1
ai	Ground rod, steel, galvanized, 10' long, 5/8" dia. min.	1	1
aj	Clamp, ground rod, tamper proof	1	1
al	Clip, ground wire	1	
al	Staples, ground wire, 2"x1/2", 8 gauge	35	35
av	Jumper, No. 4 AWG aluminum alloy, stranded	3'	
cj	Ground wire, No. 4 AWG aluminum	30'	33'
p	Connector, split bolt type	1	

GROUNDING ASSEMBLY
GROUND ROD TYPE

May 15, 1973 | EQUIPMENT PROTECTION | M2-1A, M2-11A



UNIT M2-2

PLAN OF PLATE TYPE GROUND

UNIT M2-12

Notes:

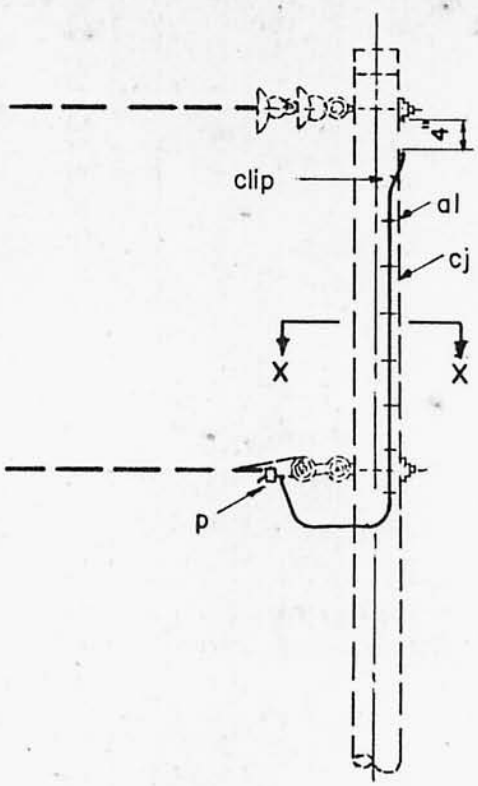
1. Ground wire to be located on same side as neutral conductor and in quadrant opposite climbing space or pole top pin.
2. Staples on ground wire shall be 2'-0" apart, except for a distance of 8'-0" above ground and 8'-0" from top of pole where they shall be 6" apart.
3. Ground wire to clear all hardware by 2" min. and shall be stapled to maintain this position.
4. For use with V and 3-phase assemblies refer to guide drawings M 30-1 and M 30-2.

ITEM	MATERIAL	ASSEMBLY UNIT M2-2	ASSEMBLY UNIT M2-12	
al	Staples, ground wire, 2" X 1/2", 8 gauge	40	35	
al	Ground wire clip	1		
cj	Ground wire jumper #4AWG, strand Al. Alloy	3'		
cj	Ground wire, Iron 5/16" dia. 3 strand galvanized	40'	38'	
dh	Butt type grounding device, plate	1	1	
p	Connector, compression	1	1	
p	Connectors, split bolt type	1		
bp	Nails, 1-inch roofing, galv.	M2-2: 4	M2-12: 4	

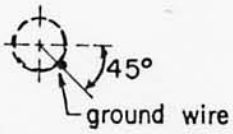
POLE PROTECTION ASSEMBLY BUTT TYPE

MAY 15, 1973

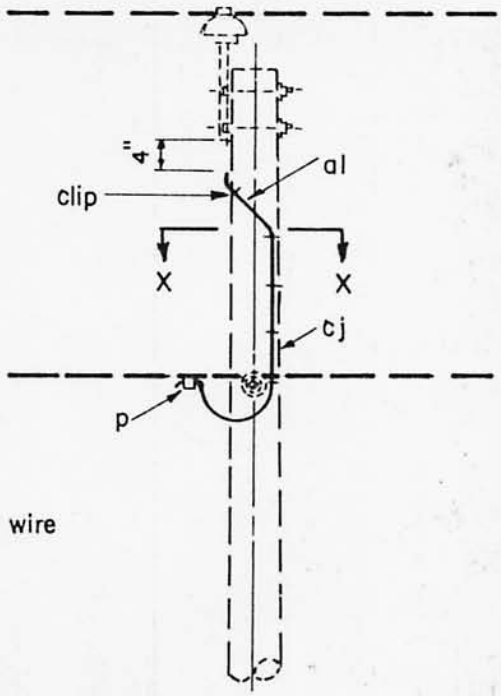
M2-2, M2-12



DEADEND ARRANGEMENT



SECTION X–X



TANGENT ARRANGEMENT

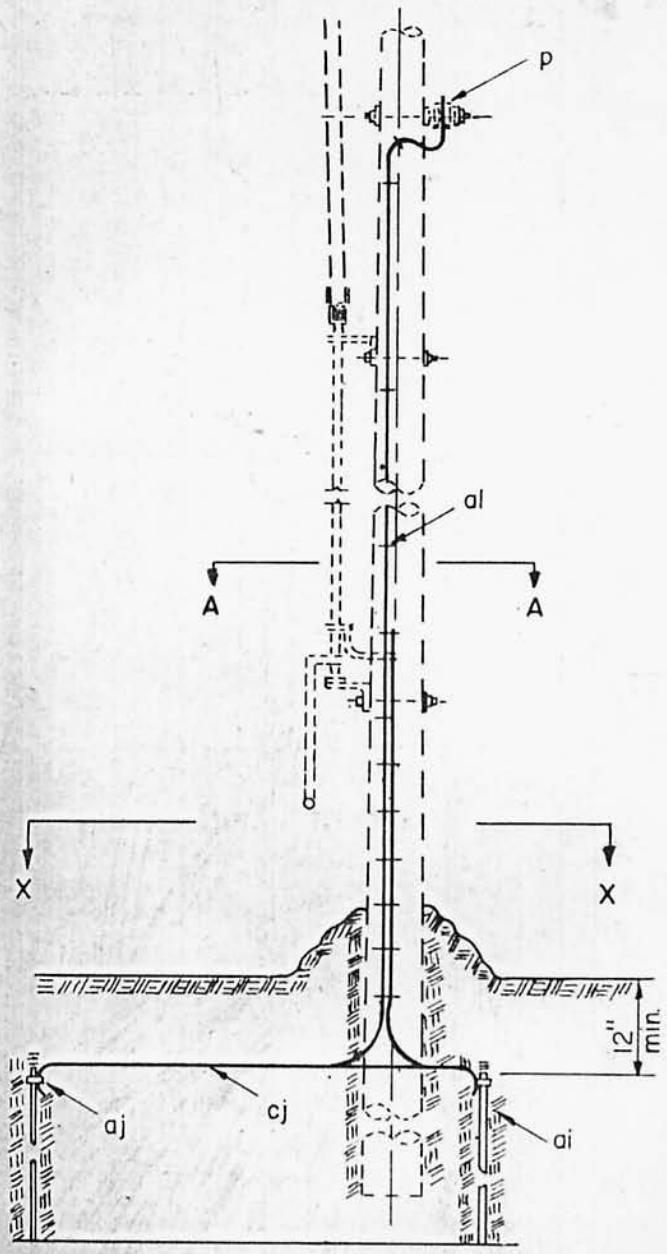
Notes:

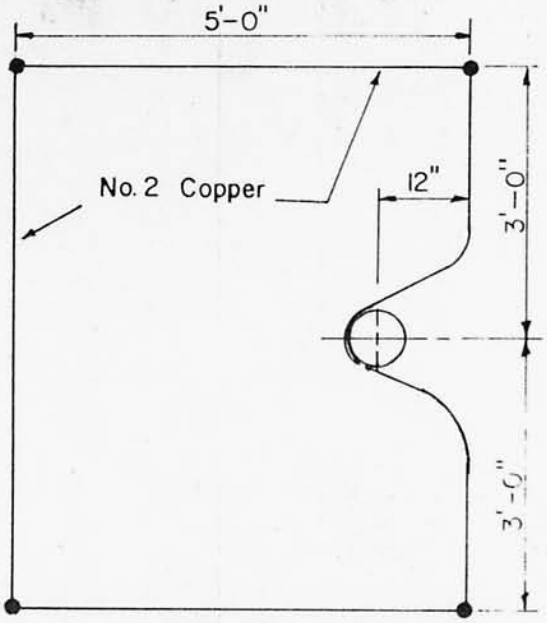
1. Ground wire to be located on same side as Neutral Conductor and in quadrant opposite climbing space.
2. Staples on ground wire to be 6" apart.
3. Ground wire to clear all hardware by 2" min. and shall be stapled to maintain this position.
4. For use with V and 3-phase assemblies refer to guide drawings M30–1 and M30–2.

ITEM	NO.	MATERIAL		ITEM	NO.	MATERIAL	
p	1	Connector, compression		al	1	Ground wire clip	
al	8	Staples, ground wire, 2"x 1/2", 8 gauge					
cj	5'	Ground wire, # 4AWG, 3 strand Al. alloy					

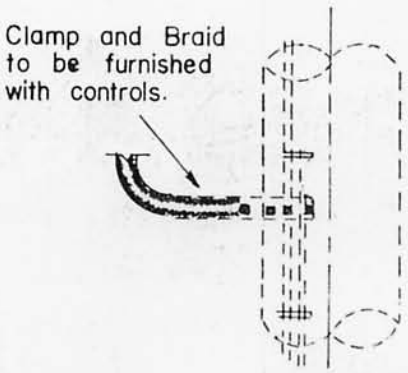
POLE TOP PROTECTION ASSEMBLY

M2-9





SECTION X – X
(DETAIL OF GROUND GRID)



DETAIL OF SECTION A–A

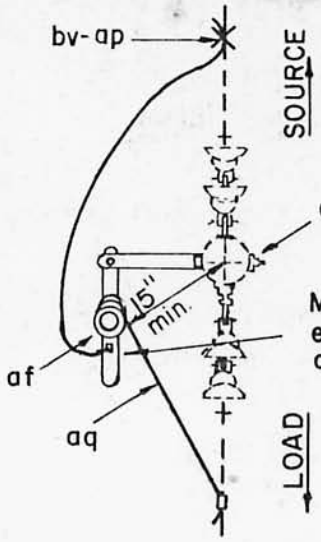
ITEM	NO.	MATERIAL		ITEM	NO.	MATERIAL	
ai	4	Rod, ground, 5/8"dia. x 10'					
aj	4	Clamp, ground rod					
al	50'	Staple, ground wire, 2" x 1/2", #8 gauge					
cj	60'	Ground wire, soft annealed iron,					
		5/16" dia. 3 strand, galv.					
p	1	Compression, connector					

GROUNDING ASSEMBLY – GROUND ROD
TYPE FOR SECTIONALIZING
AIRBREAK SWITCH

MAY 15, 1973

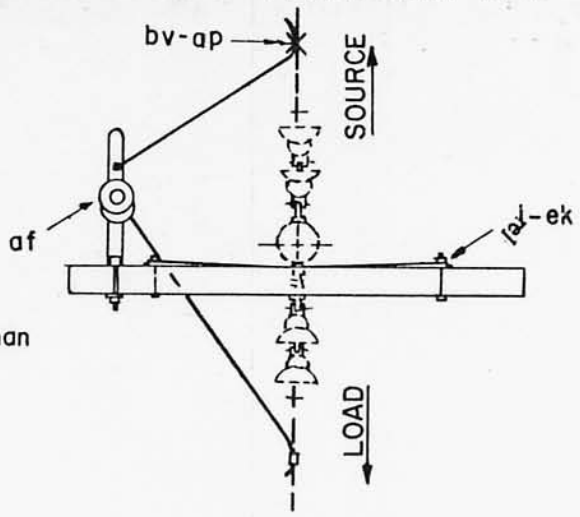
M2-15

NOTE: Install hot clamp on source side.
Tap Saddle may be used in lieu of Tapping Armor Rod.

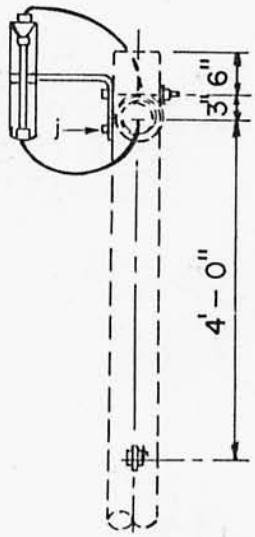


PLAN

Mount cutout so that exhaust blast of arc is directed away from lineman

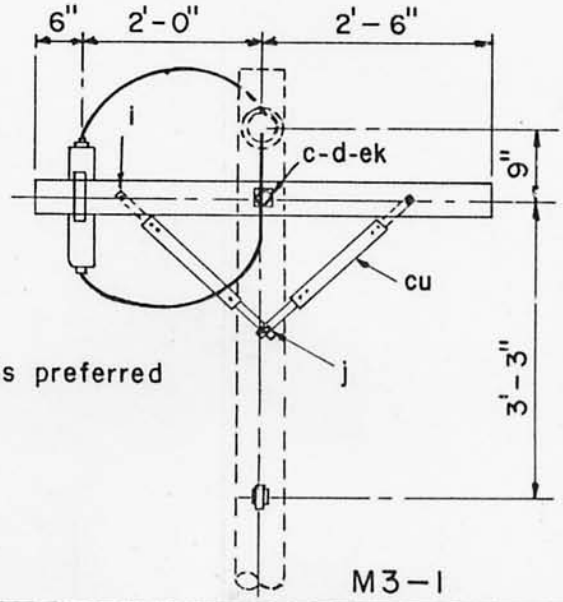


PLAN



M3-4

M 3 — 1 is preferred



M3-1

ITEM	MATERIAL	M3—4 NO. REQUIRED	M3—1 NO. REQUIRED
c	Bolt, machine, 5/8" x 14"	1	1
d	Washer, 2·1/4" x 2·1/4" x 3/16", 13/16" hole	1	2
g	Crossarm, 3·1/2" x 4·1/2" x 4'-0"		1
i	Bolt, carriage, 3/8" x 4·1/2"		2
j	Screw, lag, 1/2" x 4"	1	1
p	Connector, Compression type	2	2
af	Cutout, fuse, single shot	1	1
aq	Leads or jumpers, ACSR	3 Meters	3 Meters
cu	Brace, wood, 28"		2
fk	Bracket, extension, L type	1	
ek	Locknut 5/8"	1	1
ek	Locknut 3/8"		2
bv	Armor Rod (Tapping) *		
ap	Hot line clamp		

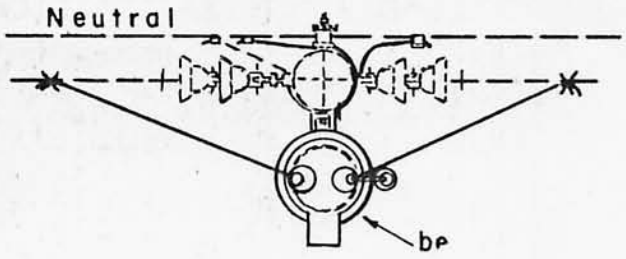
*Conductor Accessories

7.62 / 13.2 KV. 1-PHASE
ONE SECTIONALIZING FUSE CUTOUT

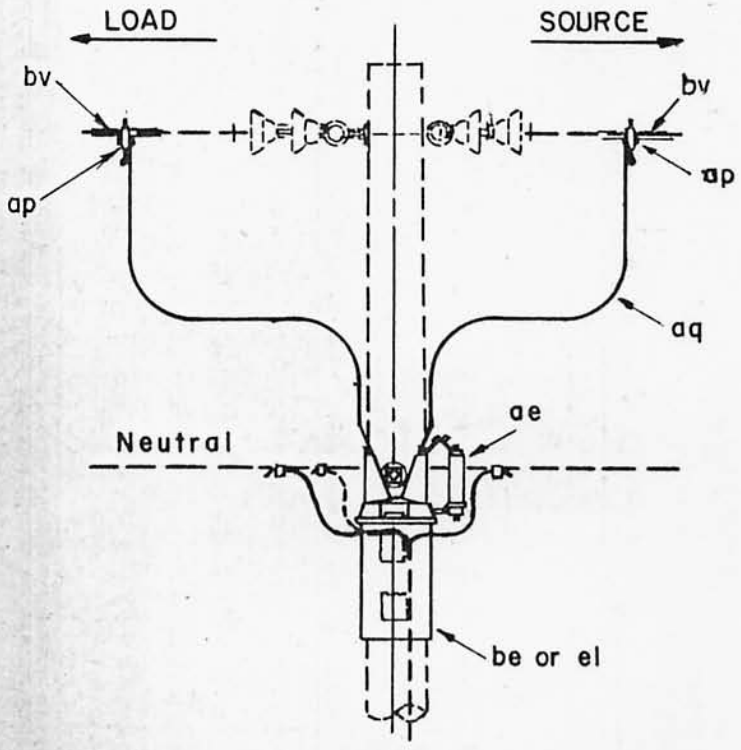
MAY 15, 1973

M3-1, M3-4

Tap Saddle may be used in lie of Tapping Armor Rod.



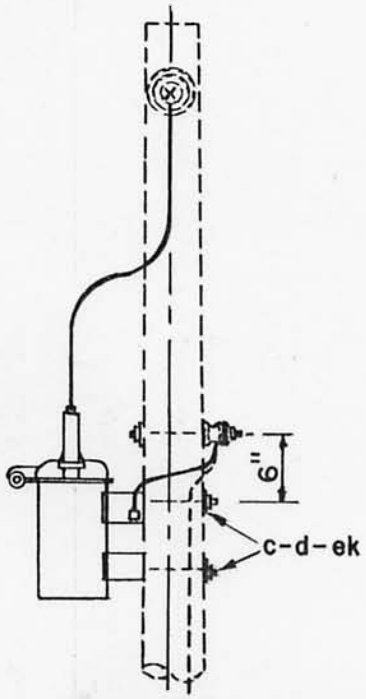
PLAN



ELEVATION

NOTE:

The terminal bushing connected directly to the coil should be connected to the source. Where necessary to provide for this connection the recloser may be mounted on the other side of the pole and the neutral deadended.



SIDE ELEVATION

* Conductor accessories

ITEM	NO	MATERIAL	ITEM	NO.	MATERIAL
c	1	Bolt, machine, 5/8"x 10"	ae	1	Lightning arrester
d	2	Washer, 2 1/4"x2 1/4"x 3/16", 13/16" hole			
p	2	Connectors, compression	el	1	Sectionalizer (M3-41 only)
ap	2	Clamp, hot line, tap assembly	ek	2	Locknuts 5/8"
aq	5M	Leads or jumpers, ACSR	bv	2	Armor rod (Tapping) *
be	1	Recloser, oil circuit (M3-10 only)			
cj	4'	Ground wire, # 4 AWG Al. Alloy			

Note:

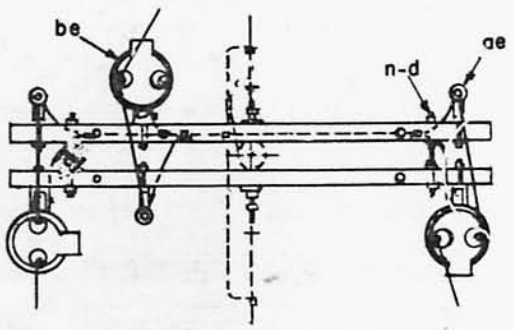
M - Length in meters

7.62 / 13.2 KV.

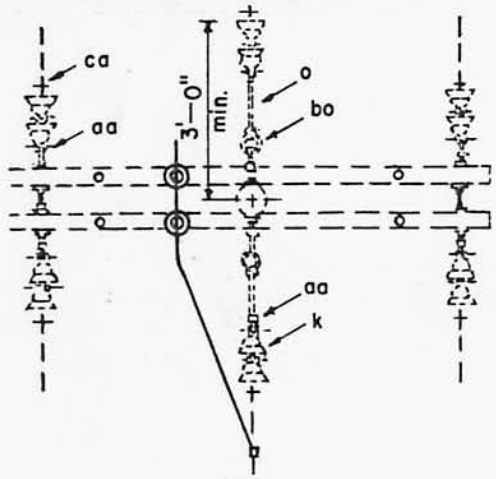
ONE SECTIONALIZER OR OIL CIRCUIT RECLOSER

May 15, 1973

M3-10, M3-41



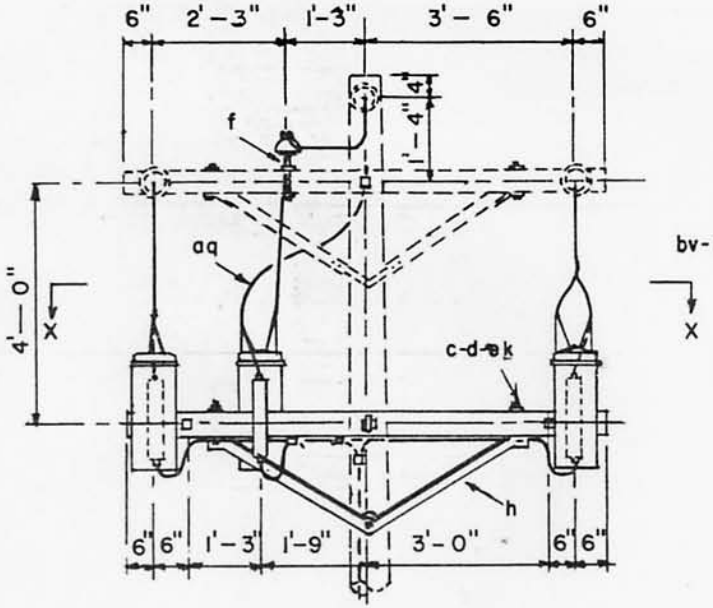
SECTION X-X



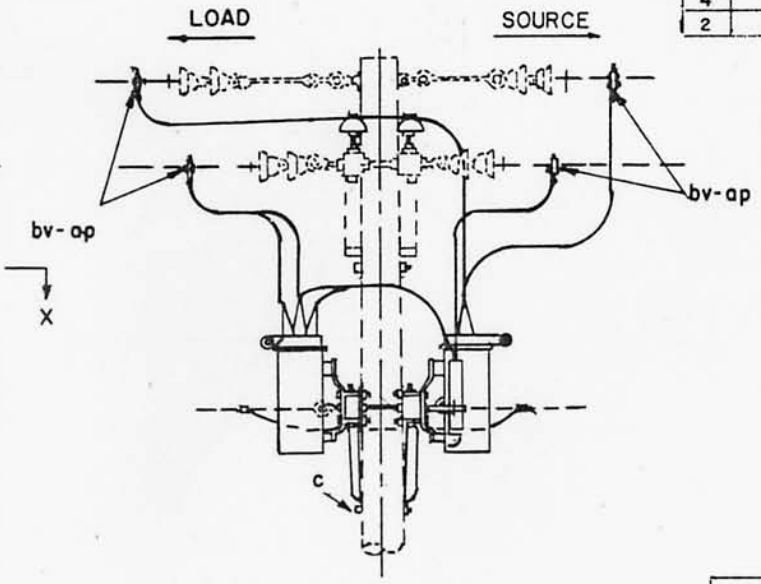
PLAN

M3-11	ITEM	M3-12	MATERIAL
2	a	2	Insulator pin type
1	c	1	Bolt, machine, 5/8" x 12"
4	c	4	Bolt, machine, 1/2" x 6"
4	d	4	Washer, Rd. 1 3/8" dia. 9/16" hole
10	d	10	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16" hole
2	g	2	Crossarm, 3 3/4" x 4 3/4" x 8'-0"
2	f	2	Pin, crossarm, steel, 5/8" x 10 3/4"
2	h	2	Brace, 1 1/2" x 1 1/2" x 13/16", 60" span
3	n	3	Bolt, double, arming, 5/8" x 20"
2	p	3	Connectors, Compression
2	s	2	Clevis, secondary swinging
2	aa	2	Nut eye, 5/8"
2	ae	3	Lightning arrester
15M	aq	30M	Jumpers or leads ACSR
2	be	3	Recloser, oil circuit
4	bv	6	Armor rod tapping *
2	cm	2	Spool Insulator, 3" dia. groove
	bo	2	Shackle, anchor
11	ek	11	Locknuts, 5/8"
4	ek	4	Locknuts, 1/2"
4	ap	6	Clamp, hotline
2		3	O C R Crossarm mounting

* Conductor Accessories



ELEVATION



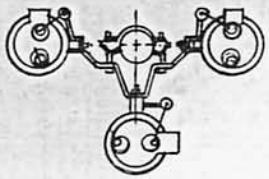
SIDE ELEVATION

NOTE:

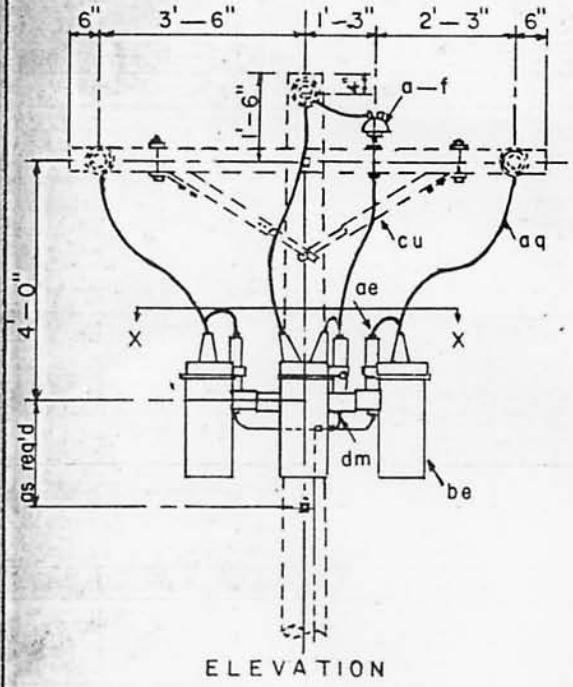
1. The recloser terminal bushing connected directly to the coil should be connected to the source.
2. For V-Phase installation omit center phase, see material list and designate M3-11
3. Each recloser tank shall have two connections to ground.
4. M-length in meters
5. Tap Saddle may be used in lieu of Tapping Armor Rod.

7.62/13.2 KV.
2 OR 3-PHASE, THREE SECTIONALIZING
OIL CIRCUIT RECLOSERS

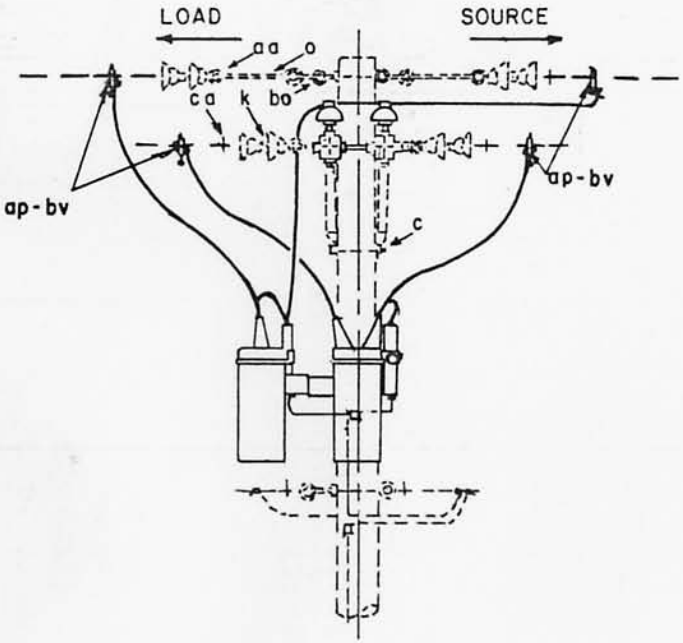
MAY 15, 1973 | M3-11, M3-12



SECTION X — X



ELEVATION



M3 11A	ITEM	M3 12A	MATERIAL
	f	2	Pin, crossarm, steel, 5/8" x10 3/4"
2	p	3	Connectors, compression
2	ae	3	Lightning arrester
15M	aq	25M	Jumpers or leads as req'd ACSR
2	be	3	Recloser, oil circuit
4	bv	6	Armor rod (Tapping) *
1	dm	1	Bracket, cluster type
	ek		Locknuts, as required
4	ap	6	Clamp , hot line, top assembly
	a	2	Insulator, pin type

NOTES:

1. The recloser terminal bushing connected directly to the coil should be connected to the source.
2. For V Phase installations omit recloser and related items on center phase. Designate as assembly M3—11A.
3. Each recloser tank shall have two connections to ground.
4. Tap Saddle may be used in lieu of Tapping Armor Rod.

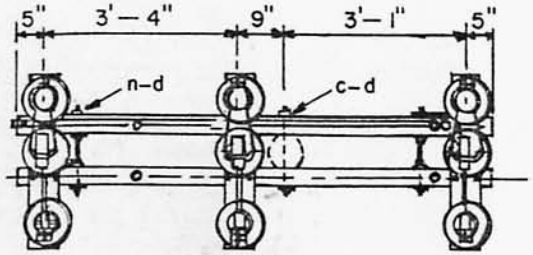
M— Length in meters

* Conductor accessories

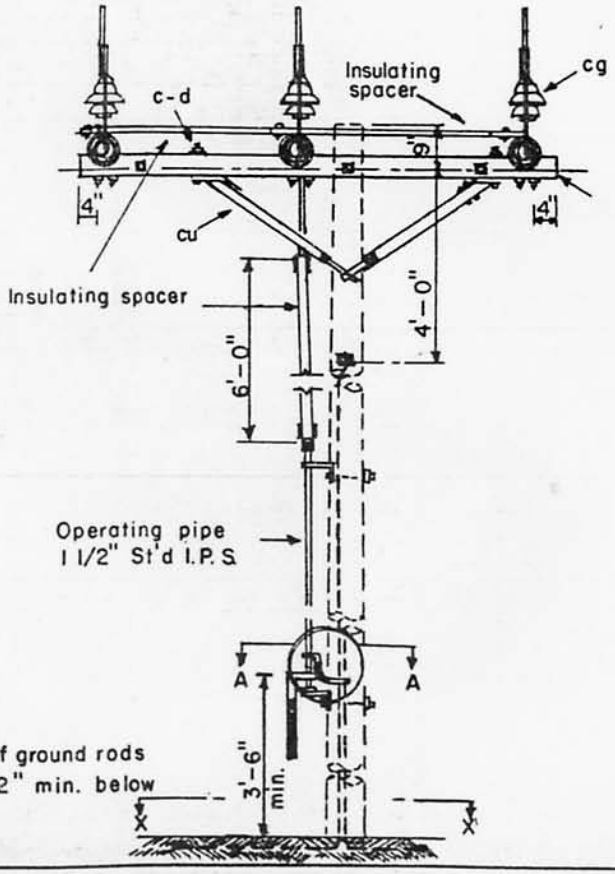
7.62/13.2 KV.
2 OR 3 SECTIONALIZING OIL CIRCUIT RECLOSER

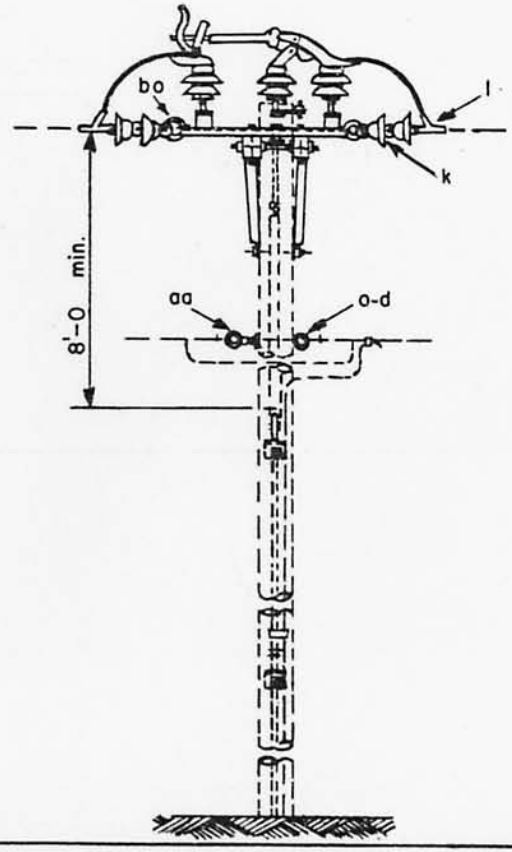
May 15, 1973

M3-11A, M3-12A



PLAN VIEW
OF SWITCH ARRANGEMENT





ITEM	NO.	MATERIALS
C	16	Bolt, machine, 5/8" x 18"
C	4	Bolt, machine, 1/2" x 6"
d	25	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16" hole
d	4	Washer, rd., 1 3/8" dia., 9/16" hole
g	2	Crossarm, 3 3/4" x 4 3/4" x 8'-0"
k	12	Insulator, suspension
l	6	Clamp, deadend
n	3	Double, arming bolt, 5/8" x 22"
o	1	Bolt, eye 5/8" x 12"
ek	4	Locknuts, 1/2"
c	3	Bolt, machine, 5/8" x 12"
p	2	Connectors, compression
s	2	Clevis, secondary swinging
bo	6	Shackle, anchor
cg	1	Switch, air break, 3 pole unit 15 KV.
		with operating mechanism & ins. spacers
cu	2	Bracewood, 60" span
aa	1	Nut, eye 5/8"
cm	2	Spool insulator, 3" dia. groove
ek	24	Locknut 5/8"
T	4'	Armor tape*

*Conductor Accesories

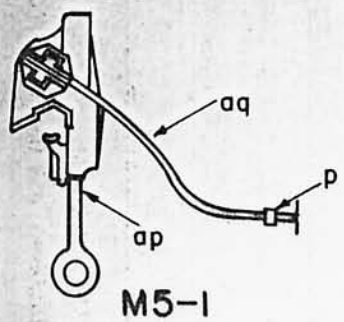
NOTE! For ground assembly, see drawing M2—15

7.62/13.2 KV.

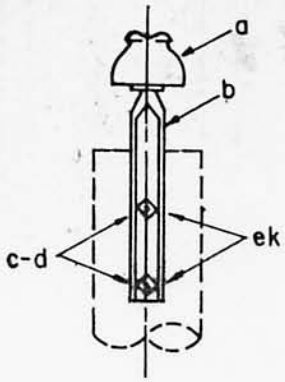
SECTIONALIZING AIR BREAK SWITCH

MAY 15, 1973

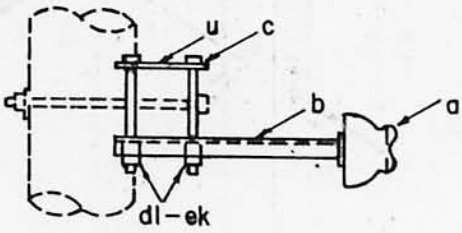
M3 — 15



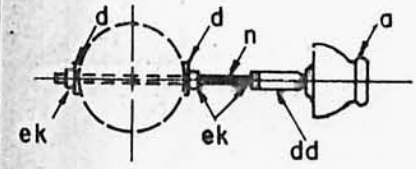
M5-1



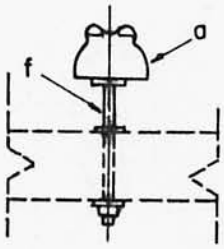
M5-2



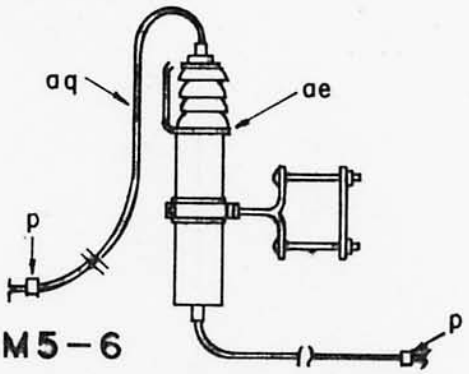
M5-3



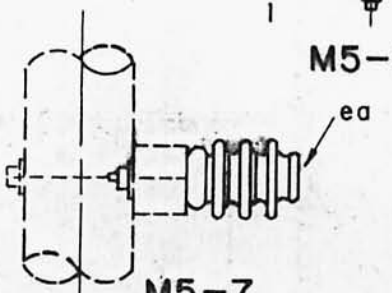
M5-4



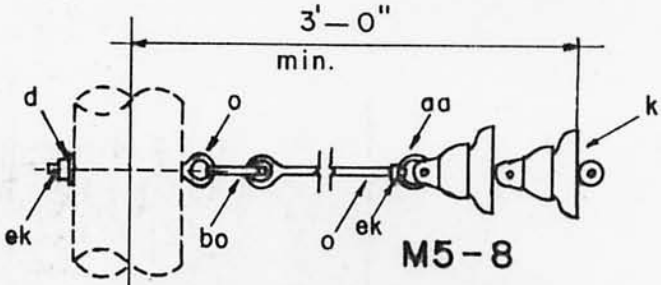
M5-5



M5-6



M5-7



M5-8

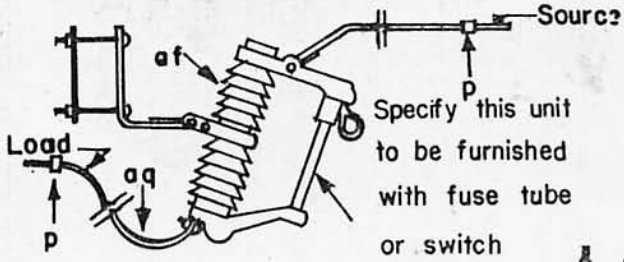
* Conductor Accessories

ITEM	MATERIAL	M5-1	M5-2	M5-3	M5-4	M5-5	M5-6	M5-7	M5-8
a	Insulator, pin type		1	1	1	1			
b	Pin, pole top, 20"		1	1					
c	Bolt, machine, 5/8" x 8"		2	2					
d	Washer, 2 1/4"x2 1/4"x3/16", 13/16"hole		2		2			1	1
f	Pin, crossarm, steel, 5/8"x10 3/4"					1			
k	Insulator, suspension								2
n	Bolt, double arming, 5/8"x14"				1				
o	Bolt, eye, 5/8"x12" and 18"								2
p	Connector, compression	1					2		
u	Clamp, guy, 3 bolt type			1/2					
aa	Nut, eye, 5/8"								1
ae	Lightning arrester						1		
ap	Clamp, hot line	1							
aq	Jumper	1					2		
bo	Shackle, anchor								1
dd	Adapter, insulator				1				
dl	Pipe spacer, pole pin			2					
ea	Insulator, Post type, 7" stud							1	
ek	Locknuts 5/8"	2	2	2	3				2
bv	Armor rod (Topping) *	1							

7.62/13.2 KV.
MISCELLANEOUS PRIMARY ASSEMBLIES

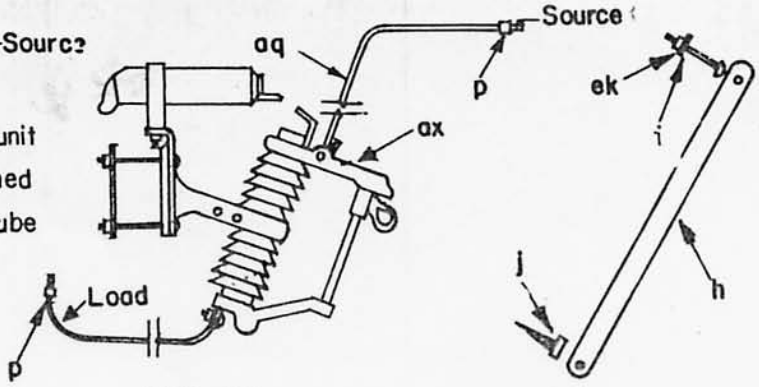
May 15, 1973

M5-1 TO 8



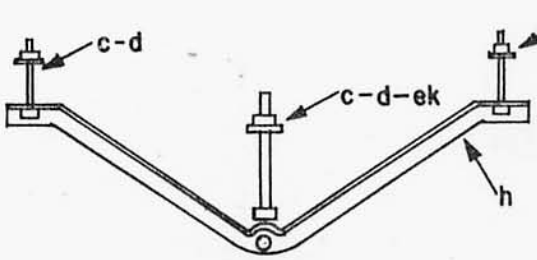
Specify this unit to be furnished with fuse tube or switch blade.

M5-9

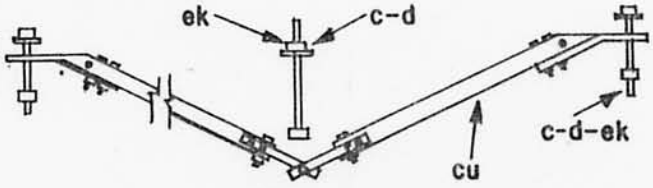


M5-10

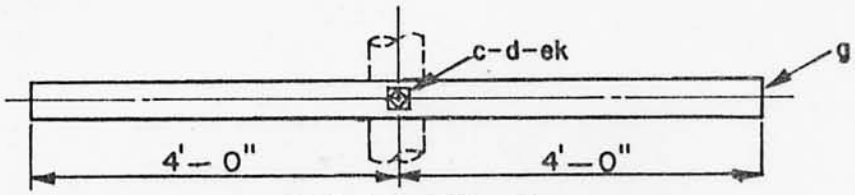
M5-11



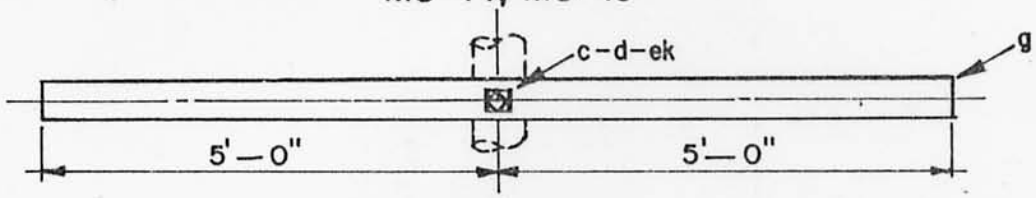
M5-12



M5-13



M5-14, M5-15



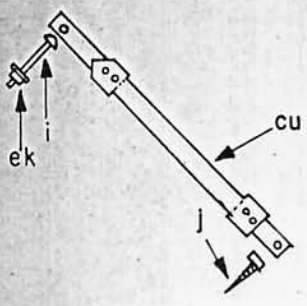
M5-16

ITEM	MATERIAL	NUMBER REQUIRED							
		M5-9	M5-10	M5-11	M5-12	M5-13	M5-14	M5-15	M5-16
c	Bolt, machine, 5/8" x 12" and 16"				1	1	1	1	1
c	Bolt, machine, 1/2" x 6"				2	2			
d	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16" hole				1	1	2	2	2
d	Washer, round, 1 3/8" dia., 9/16" hole				2	2	1		
g	Crossarm, 3 1/2" x 4 1/2" x 8'-0"						1		
g	Crossarm, 3 3/4" x 4 3/4" x 10'-0"								1
h	Brace, flat, 1 1/4" x 1/4" x 28"			1					
h	Brace, angle, 1 1/2" x 1 1/2" x 3/16", 60" span				1				
j	Bolt, carriage, 3/8" x 4 1/2"			1					
j	Screw, lag, 1/2" x 4"			1					
p	Connector, compression	2	2						
af	Cutout, single-shot	1							
aq	Jumper	2	2						
ax	Cutout and arrester combination		1						
cu	Brace, wood, 60" span					1			
ek	Locknuts 1/2"			1	2	2			
g	Crossarm, 3 3/4" x 4 3/4" x 8'-0"							1	
ek	Locknuts 5/8"				1	1	1	1	1

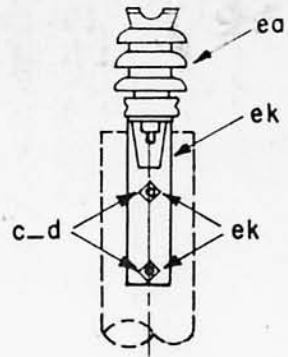
MISCELLANEOUS PRIMARY ASSEMBLIES

May 15, 1973

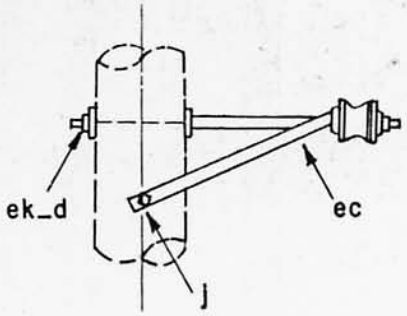
M5-9 TO 16



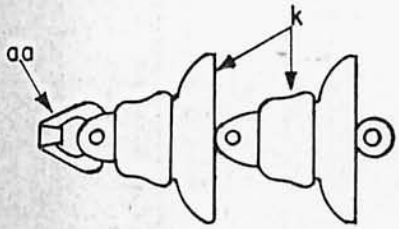
M5-17



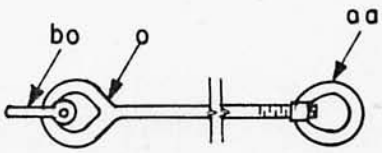
M5-18



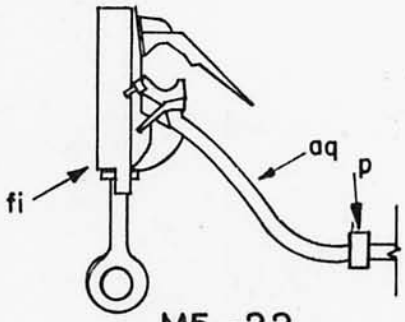
M5-19



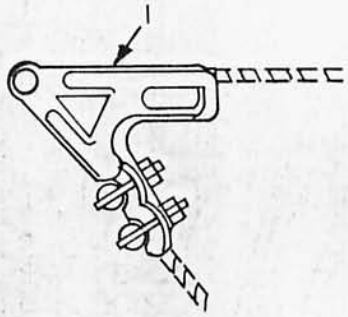
M5-20



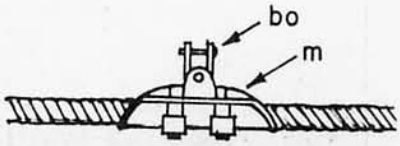
M5-21



M5-22



M5-23



M5-24

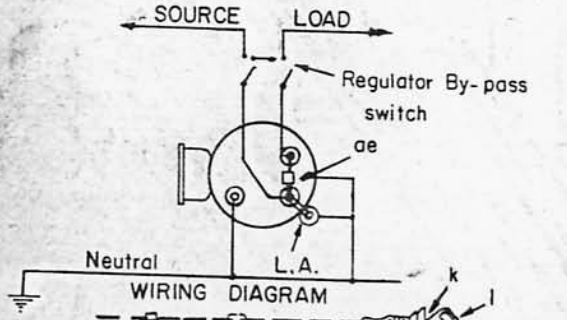
ITEM	MATERIAL	M5-17	M5-18	M5-19	M5-20	M5-21	M5-22		M2-24
c	Bolt, machine, 5/8" x required length		2						
d	Washer, 2 1/4" square		2	1					
i	Bolt, carriage, 3/8" x 4 1/2"	1							
j	Screw, lag, 1/2" x 4"	1		1					
k	Insulator, suspension				2				
ea	Insulator, post type, 1 3/4" stud		1						
eb	Bracket, for post type insulator		1						
ec	Bracket, offset, neutral, insulated			1					
ek	Locknuts 3/8"	1	2	1					
cu	Brace, wood, 28"	1							
aa	Eye nut 5/8"				1	1			
bo	Shackle, anchor					1			1
o	Bolt, eye, 5/8" x 18"					1			
fi	Connector, hot line						1		
aq	Jumper						1		
p	Connector, compression						1		

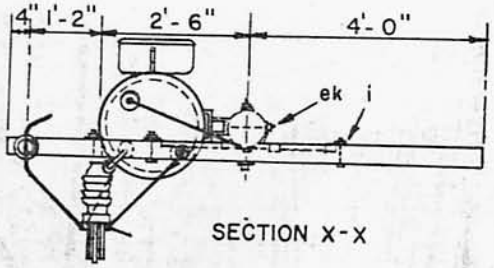
ITEM	MATERIAL	M5-23	M5-24
l	Clamp, deadend	1	
m	Clamp, suspension		1

MISCELLANEOUS PRIMARY ASSEMBLIES

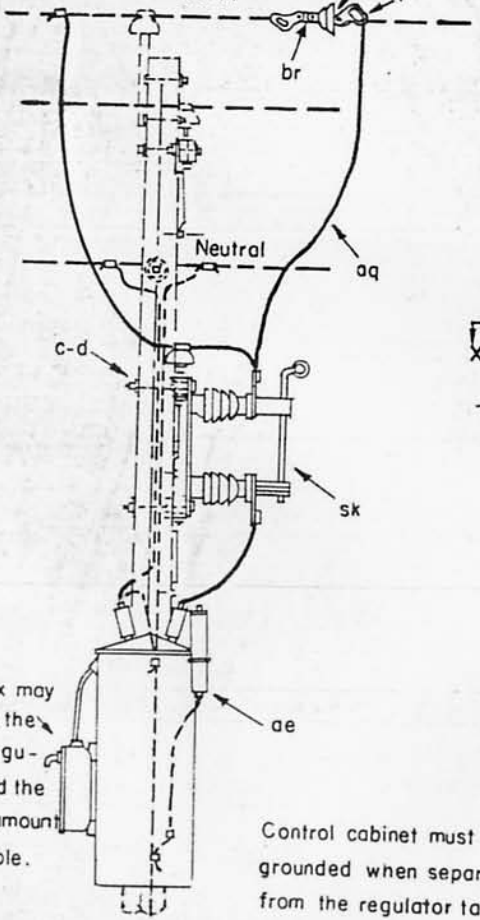
May 15, 1973

M5-17 TO 24



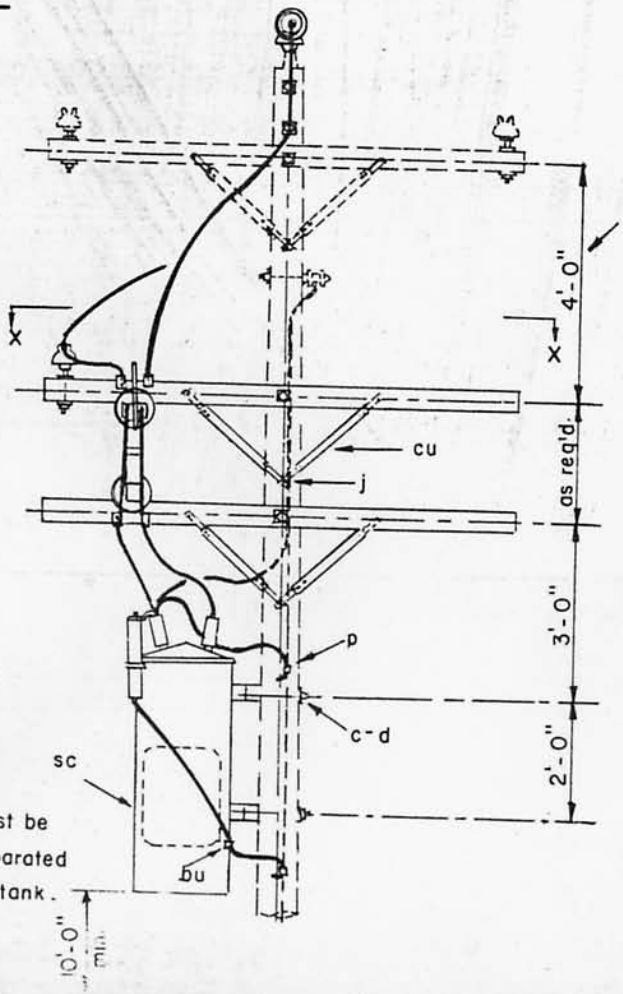


SECTION X-X



Note

Control box may be located on the pole below regulator. If so, add the the required amount of control cable.



Control cabinet must be grounded when separated from the regulator tank.

Reduced to 3'-0" where the 6th edition of NESC is effective.

ITEM	NO. REQ'D	MATERIAL
a	1	Insulator, pin type
c	4	Bolt, machine, 1/2"x6"
c	4	Bolt, machine, 3/8" x5"
d	4	Washer, round, 1 3/8" dia, 9/16 hole
d	9	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16" hole
f	1	Pin, crossarm, 5/8" x 10 3/4"
g	2	Crossarm, 3 1/2" x 4 1/2" x 8'-0"
i	4	Bolt, carriage, 3/8" x 4 1/2"
j	2	Screw, lag, 1/2" x 4"
k	1	Insulator, suspension
ek	4	Locknuts 3/8"
l	2	Clamp, deadend
p	4	Connectors, compression
c	2	Bolt, machine 5/8" x 16"
ae	1	Lightning arrester
ae	1	By-pass arrester *
aq	10M	Leads or jumpers ACSR
br	1	Chain link, 5/8" x 3 1/4"
bu	1	Connector, solderless *
cu	4	Bracewood, 28"
sc	1	Regulator, step type
sk	1	Regulator, by-pass switch
ek	4	Locknuts 1/2"
ek	4	Locknuts 5/8"
c	2	Bolt, machine 5/8" x 12"

* Specify this item to be furnished by the Regulator manufacturer.

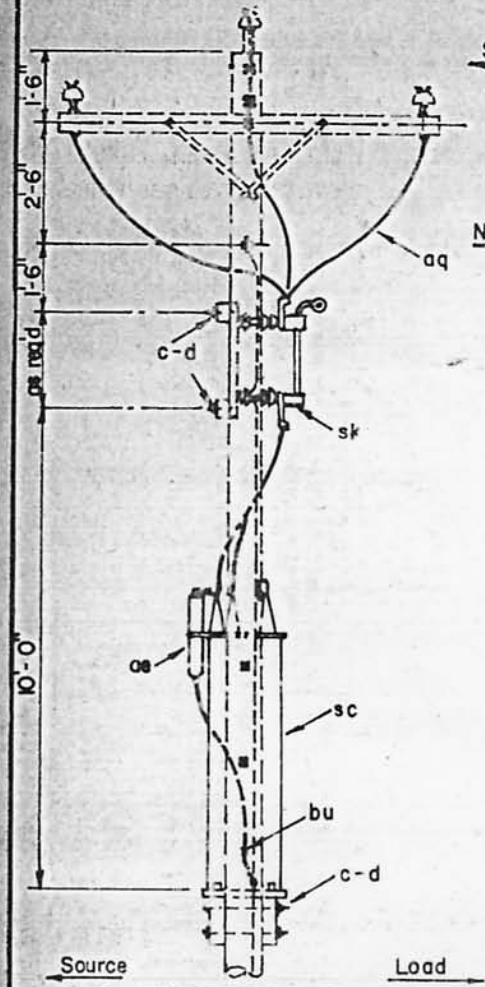
Note

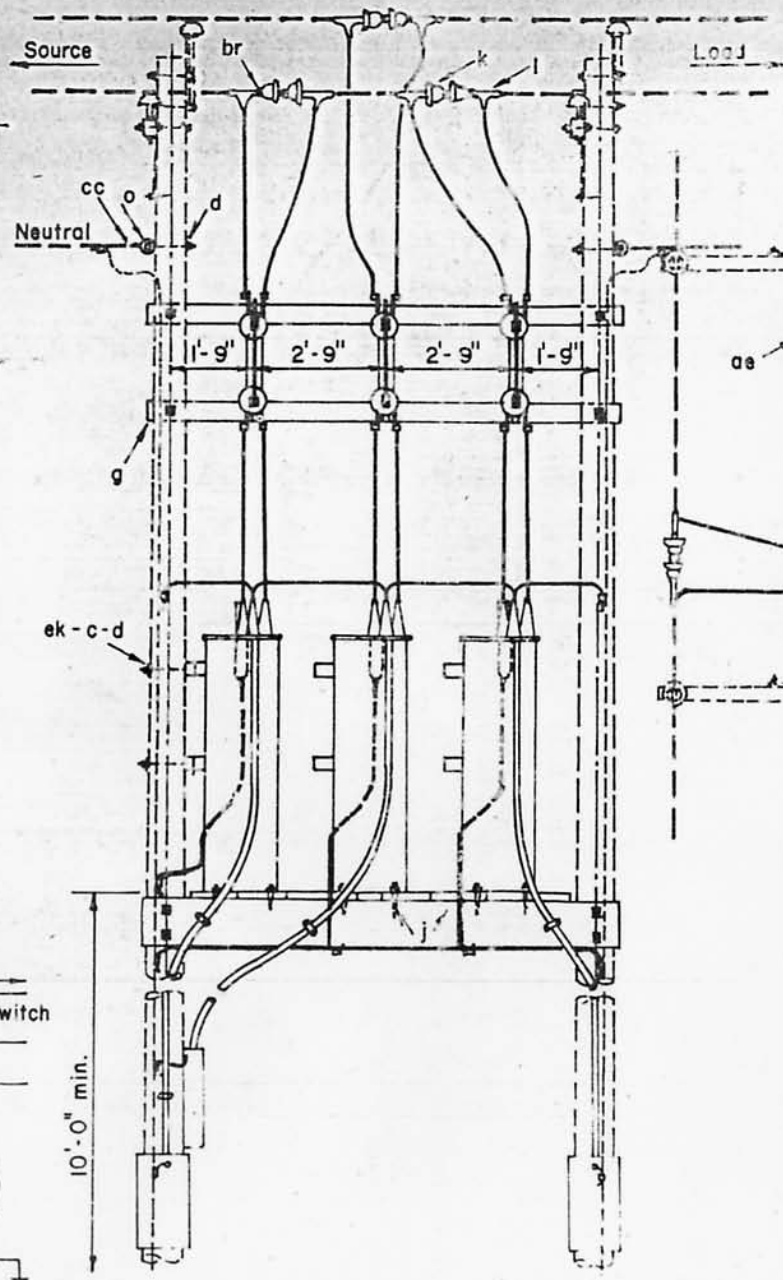
Where strenght of existing pole is inadequate for regulator weight, use two pole structure, M-Lenght in meters.

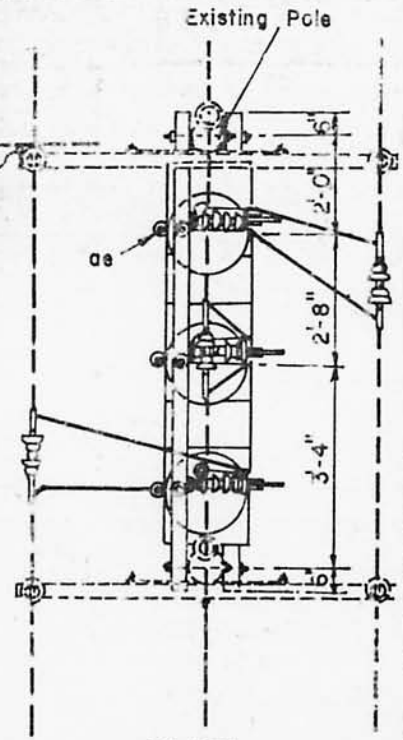
7.62/13.2KV
ONE VOLTAGE REGULATOR POLE MOUNTED

May 15, 1973

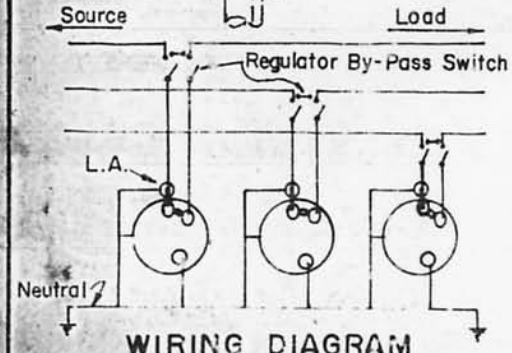
M7-11







PLAN



WIRING DIAGRAM

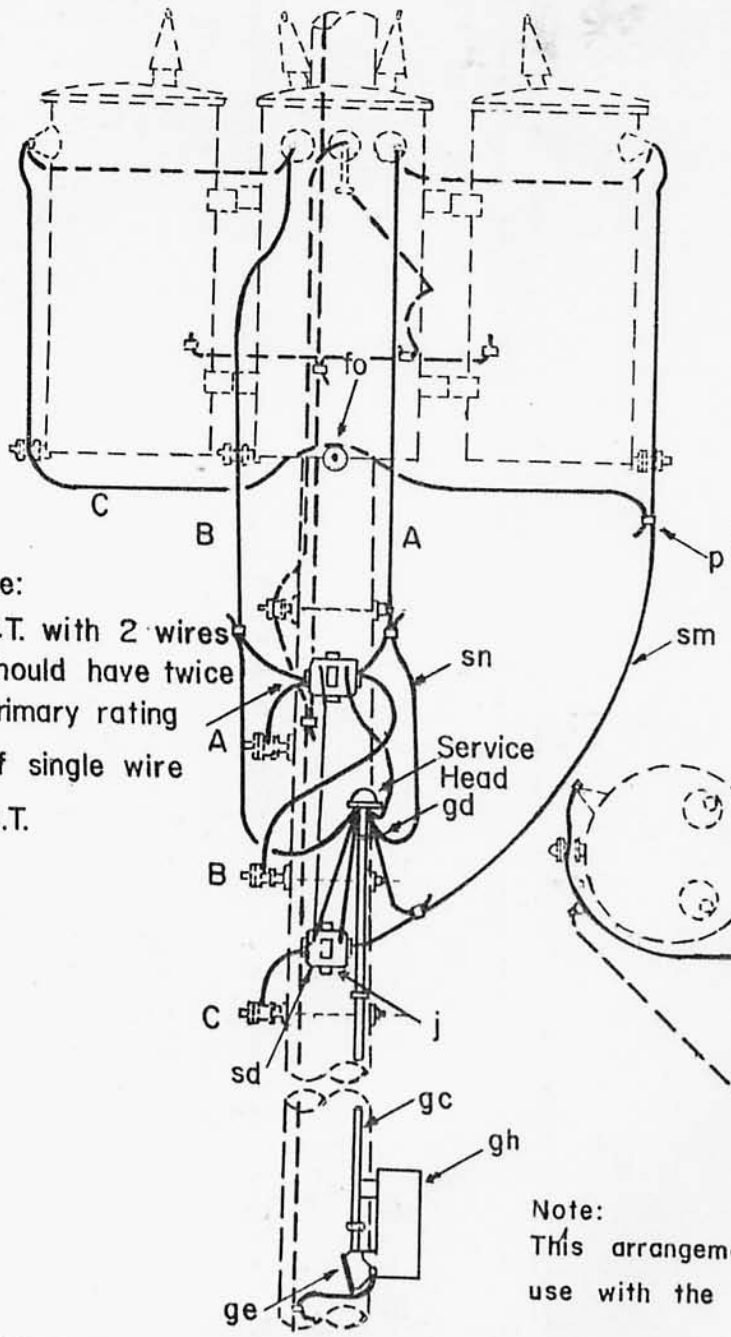
ITEM	NO REQD	MATERIAL
c	6	Bolt machine, 5/8"x req'd length
c	4	Bolt machine, 3/4"x req'd length
d	0	Washer, 2 1/4"x2 1/4"x3/16"x13/16" hole
g	2	Crossarm, 3 3/4"x4 1/2"x10'-0"
j		Screw lag, 1/2"x3", as req'd
j	8	Screw lag, 3/8"x4"
k	6	Insulator, Suspension
l	6	Clamp, deadend
o	2	Bolt, eye, 5/8"x req'd length
p		Connectors, as required
ae	3	Lightning arrester
ae	3	By-pass arrester *
aq		Jumpers, as req'd
br	3	Chain link, 5/8"x3 1/4"
bu	3	Connector, solderless *
cc	2	Deadend assembly, Neutral
sc	3	Regulator, Step Type
sk	3	By pass switch
	2	Structural timber, 4"x12"x10'-0"
		Planks, 2"thk., length as req'd
ek		Locknuts
		Remote control kit with mounting hardware *

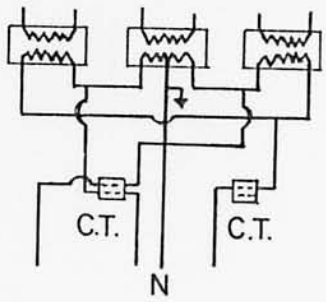
* Specify this item to be furnished by the regulator manufacturer.

7.2/12.5 KV THREE VOLTAGE REGULATORS PLATFORM MOUNTED

JAN. 5, 1976

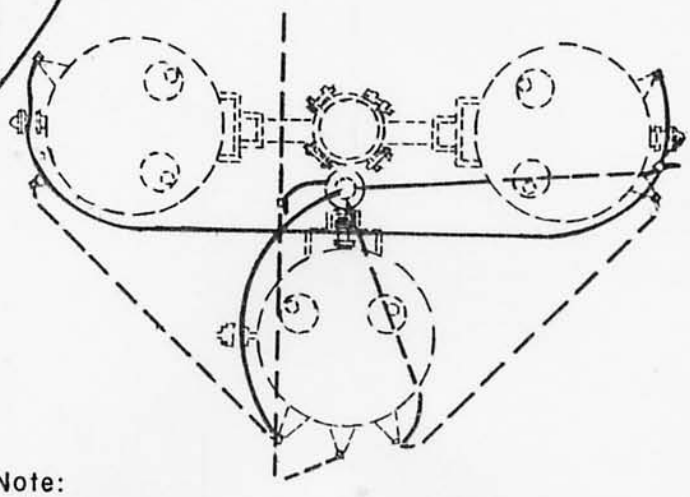
M7-14





WIRING DIAGRAM
FOR INSTRUMENT TRANFORMERS

Note:
C.T. with 2 wires should have twice primary rating of single wire C.T.



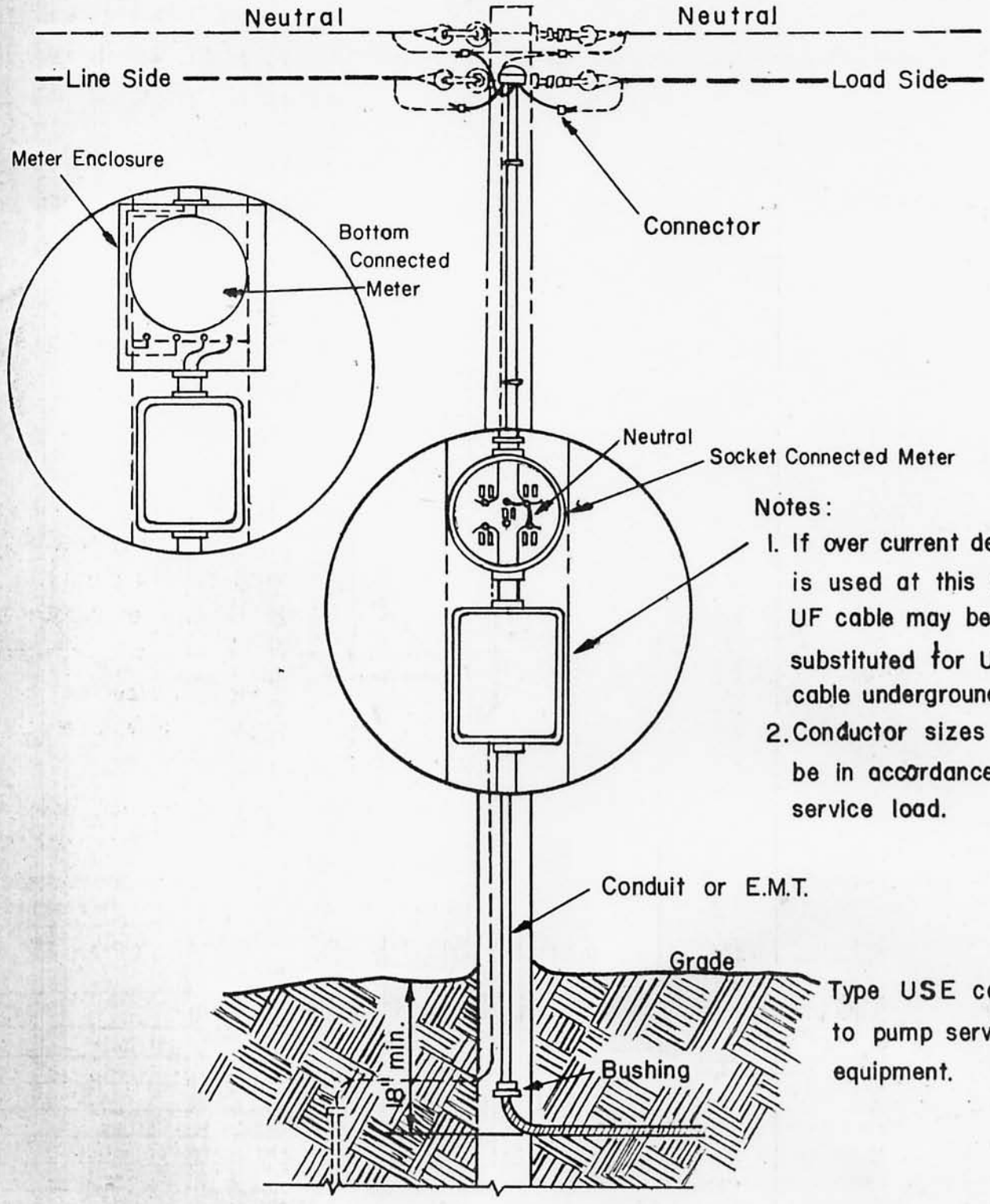
Note:
This arrangement of metering equipment is designed for use with the transformer drawings G310

ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
j	4	Screw, lag, 1/2"x 4"	gh	1	Meter box, meter and test block
p	5	Connectors, compression	sd	2	Transformer, current
gc	15'	Conduit, 1 1/4"		1	Service head
ge	1	Condulet, type "LB"	sm	80'	Wire, No.12, insul. for current
gd	6	Straps, conduit	sn	80'	Wire, No.14, insul. for potential
fo	1	Transformer secondary bracket			

SECONDARY METERING GUIDE
THREE PHASE 120/240 or 240/480 VOLTS 4 WIRE DELTA

May 15, 1973

M8-6



Notes:

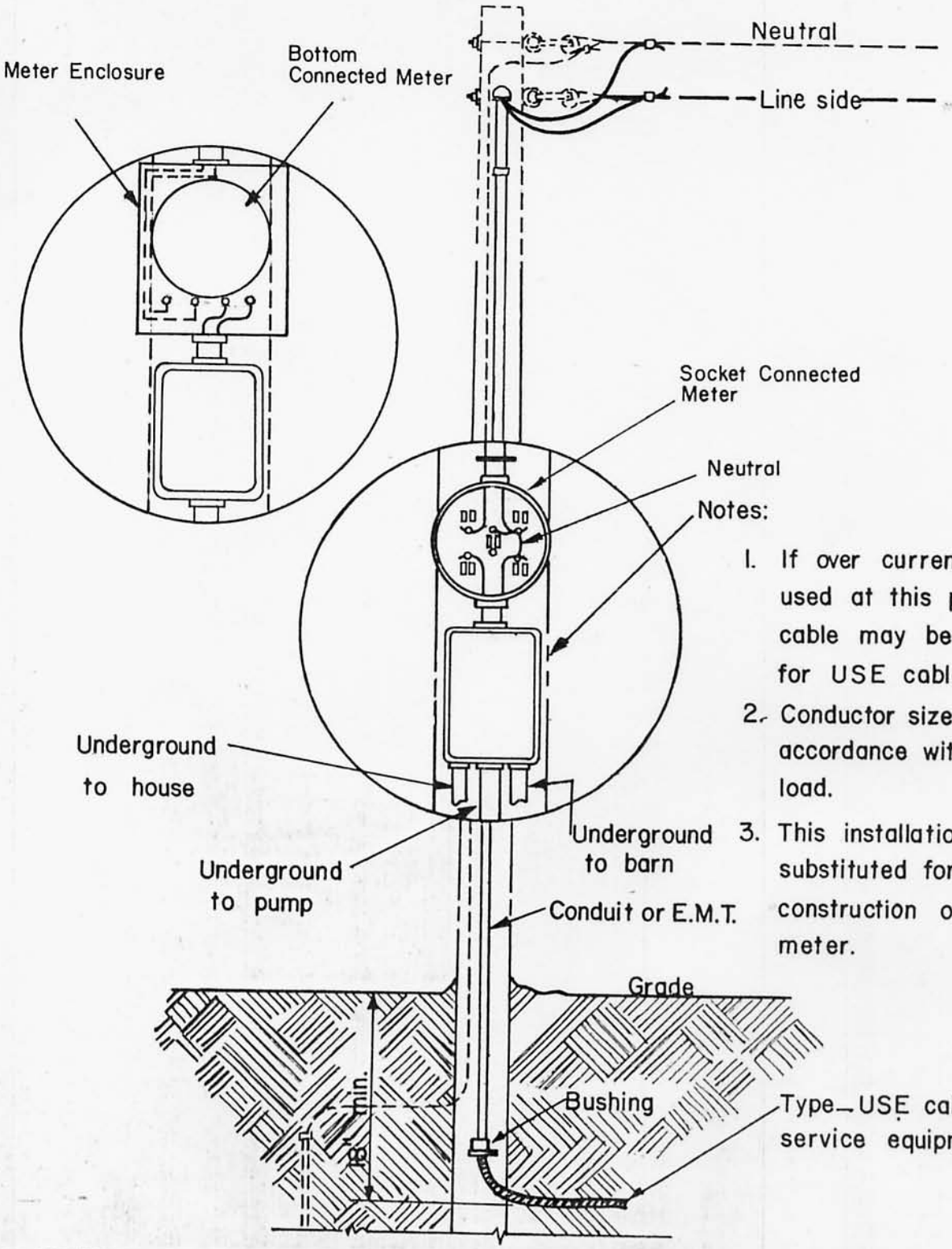
1. If over current device is used at this point UF cable may be substituted for USE cable underground.
2. Conductor sizes will be in accordance with service load.

Type USE cable to pump service equipment.

GUIDE TO YARD POLE METER INSTALLATION (SHOWING PUMP SERVICE CARRIED UNDERGROUND)

May15, 1973

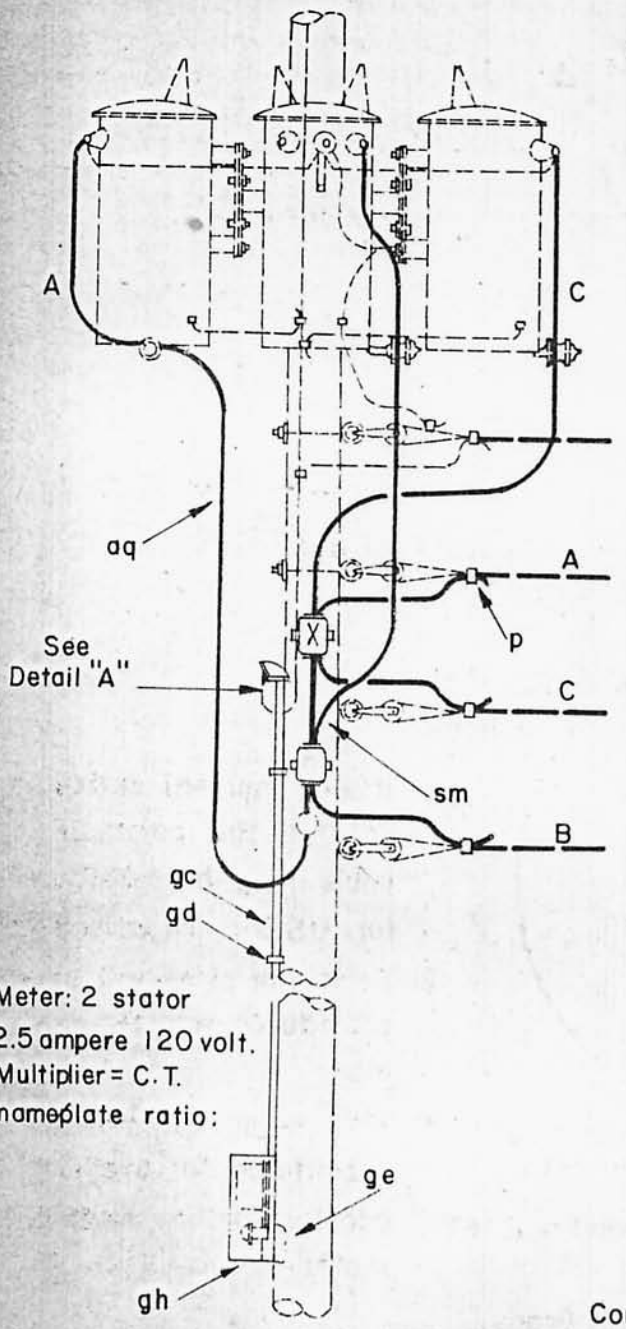
M8—9



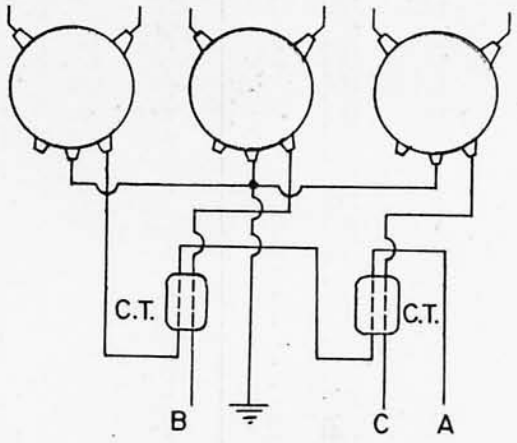
GUIDE TO YARD POLE METER INSTALLATION
(SHOWING ALL BUILDING SERVICE
CARRIED UNDERGROUND)

May 15, 1973

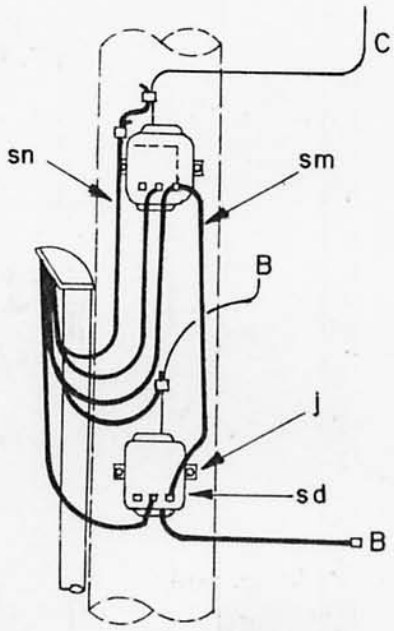
M8-10



Meter: 2 stator
2.5 ampere 120 volt.
Multiplier = C.T.
nameplate ratio:



WIRING DIAGRAM



DETAIL "A"

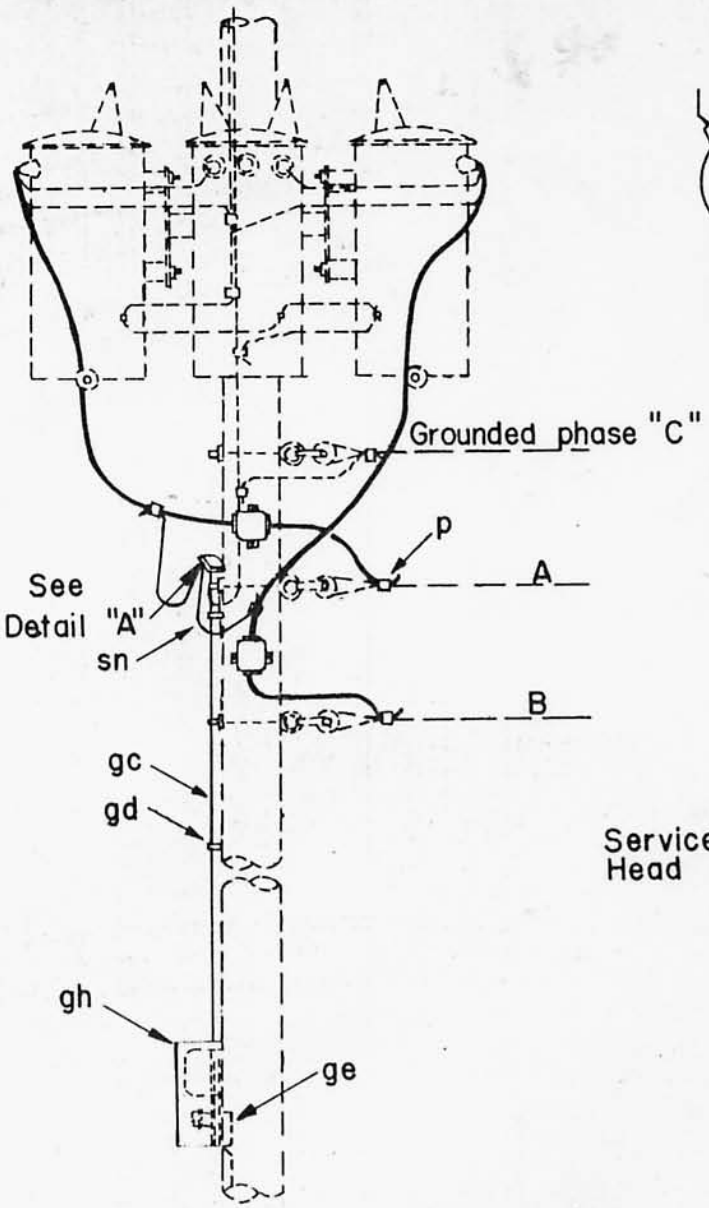
Connections from C.T's to Service Head

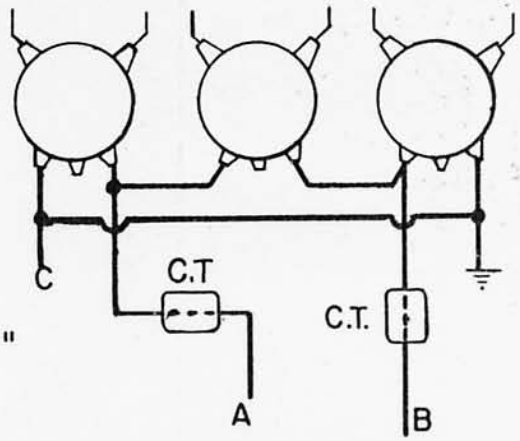
ITEM	No.	MATERIAL	ITEM	No.	MATERIAL
j	4	Screw, lag	gh	1	Meter box, meter and test block
p	3	Connectors, compression	sd	2	Transformer, current
aq		Jumpers, insulated	sm	60'	Wire, No.12, insul. for current
gc	15'	Conduit, 1 1/4",	sn	40'	Wire, No.14, insul. for potential
gd	6	Straps, conduit,		1	Service Head
ge	1	Condulet, type "LB"			

SECONDARY METERING GUIDE
THREE PHASE, 120/208 VOLTS
4 WIRE GROUNDED WYE

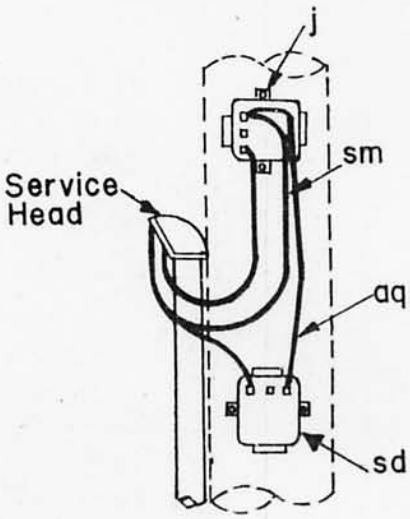
May 15, 1973

M8-11





WIRING DIAGRAM



DETAIL "A"

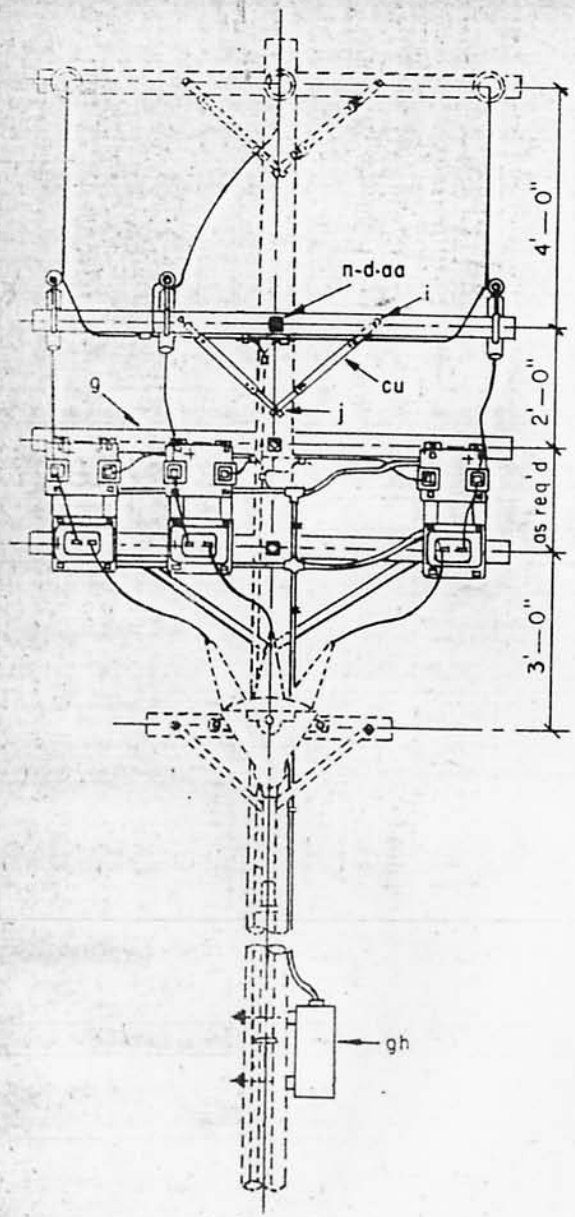
Connections from C.T's to Service Head

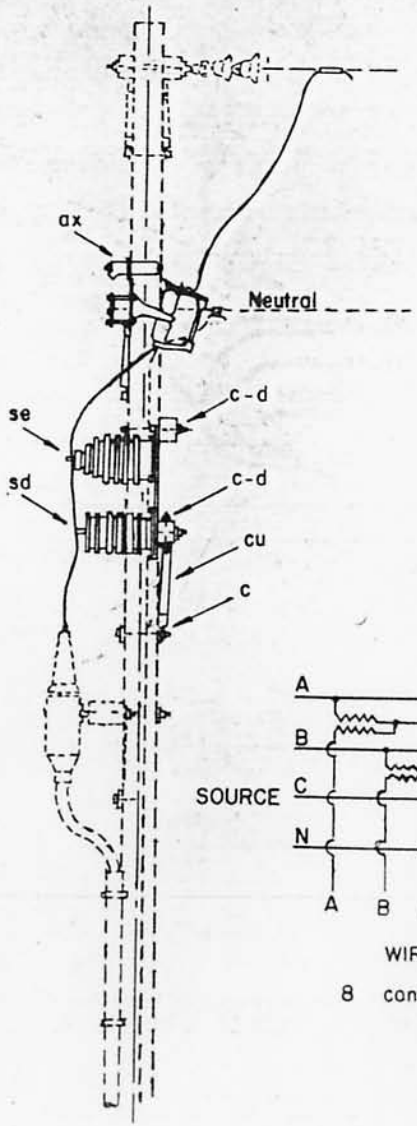
ITEM	NO.	MATERIAL	ITEM	NO.	MATERIAL
j	4	Screw, lag, 1/2"x 4"	sd	2	Transformer, current
p		Connectors, as required	sm	60	Wire, No.12, insul. for current
	1	Service head	sn	40'	Wire, No.14, insul. for potential
gc	15'	Conduit, 1 1/4",	aq		Jumper
gd	6	Straps, conduit,			
ge	1	Conduiet, type "LB"			
gh	1	Meter box, meter and test block			

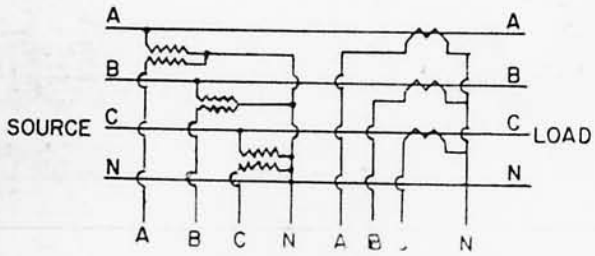
SECONDARY METERING GUIDE
THREE PHASE 240 VOLTS
3 WIRE CORNER GROUNDED DELTA

May 15, 1973

M8—12







WIRING DIAGRAM

8 conductor metering cable

in conduit

ITEM	NO.	MATERIAL
c	2	Bolt, machine, 5/8" x 14"
c	2	Bolt, machine, 1/2" x 6"
d	4	Washer, round, 1-3/8" dia, 9/16" hole
d	22	Washer, 2-1/4" x 2-1/4" x 3/16", 13/16" hl.
g	3	Crossarm, 3-1/2" x 4-1/2" x 8'— 0"
c	12	Bolt, machine, 5/8" x 6"
c	24	Bolt, machine, 1/2" x 2"
c	1	Bolt, machine, 5/8" x 10"
f	2	Bolt, carriage, 3/8" x 4-1/2"
j	1	Screw, lag, 1/2" x 4"
n	1	Bolt, double arming, 5/8" x 16"
p		Connectors, as required
aa	1	Nut, eye, 5/8"
ag	15M	Jumper, primary, bare # 4 ACSR
ax	3	Cutout and arrester combination
cc	1	Deadend assembly, neutral
cu	2	Brace, wood, 28"
cu	1	Brace, wood, 60" span
ge		Conduits, as required
st	3	Transformer, current
se	3	Transformer, potential
gh		Meter box, meter and test block
*	6	Mounting brackets
		Metering cable as required

* Specify this item to be furnished by the transformer manufacturer

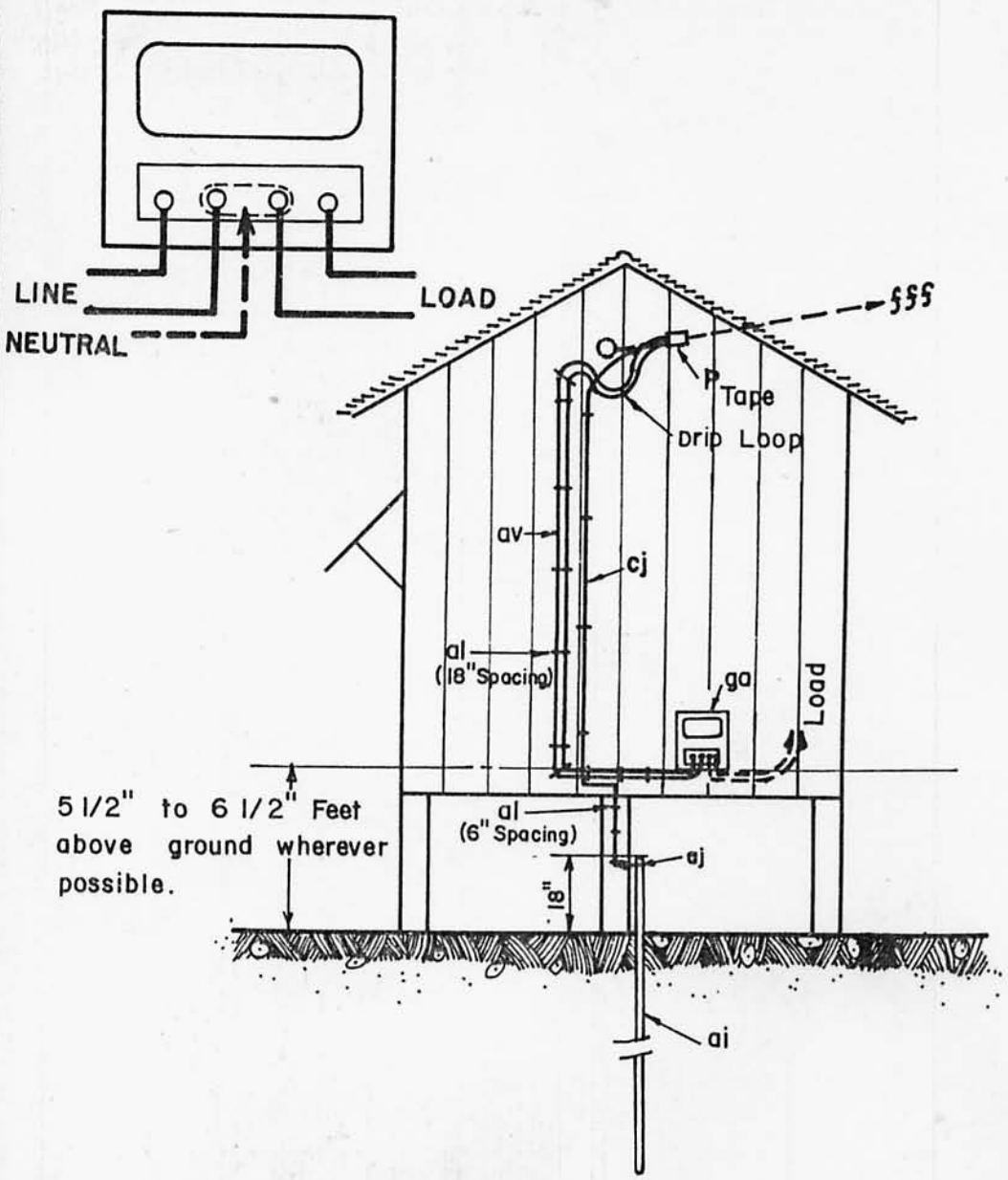
NOTE: M — Length in meters

7.62/13.2 KV PRIMARY METERING GUIDE

THREE PHASE 4-WIRE STAR

May 15, 1973

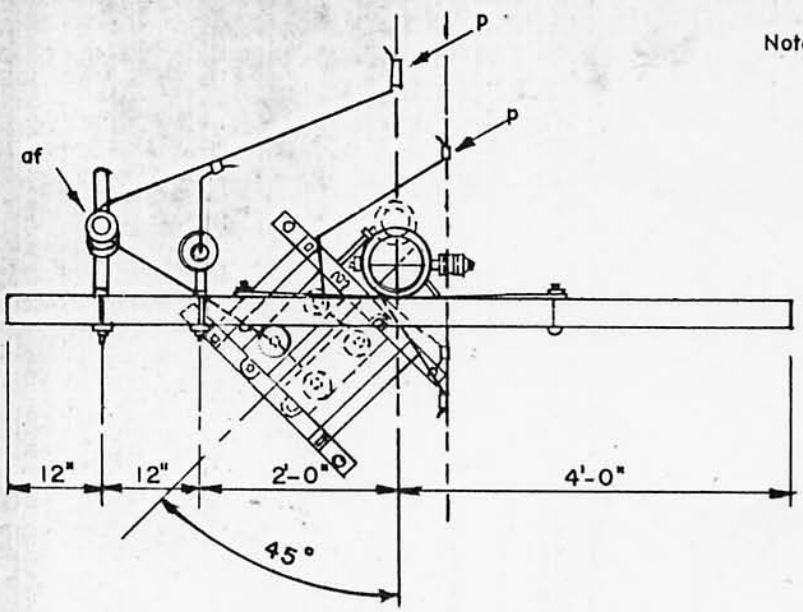
M 8—15



ITEM	No.	MATERIAL	ITEM	No	MATERIAL
av	15'	Cable, service entrance, No. 10 AWG,	cj	10'	Ground wire, #6 Aluminum, solid or stranded
		two conductor, non-metalic.	ga	1	Meter, watthour, bottom connection type
p		Connector, as required	aj	1	Clamp ground rod, tamperproof
sn	1	Cap, service entrance (Optional)			
al	10	Staples, 7/8" insulated			
al	10	Staples, ground wire 2" x 1/2"			
ai	1	Rod, ground 5/8" x 10" galv. steel			

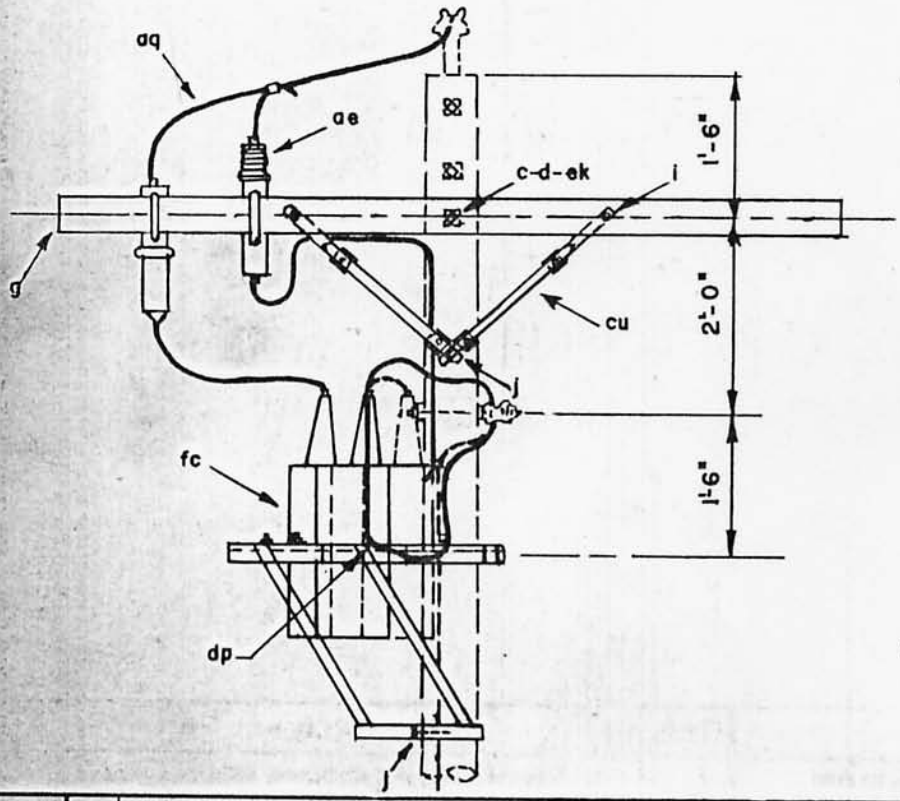
SECONDARY METERING
SINGLE PHASE AT RURAL DWELLING

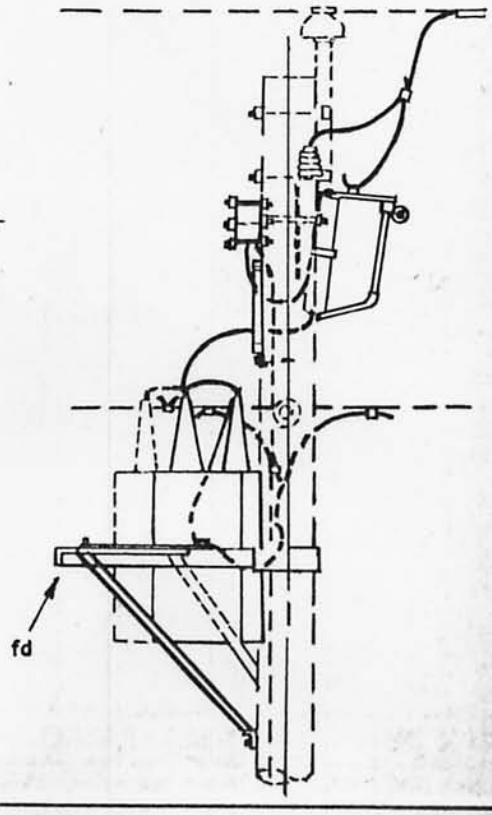
MAY 28, 1976	30 AMPERE LOAD MAXIMUM	M8 - 16



Notes:

1. Specify number and KVAR required.
2. Load Break cutouts for installation over 75 KVAR.
3. Specify insulating caps for primary terminal bushings.





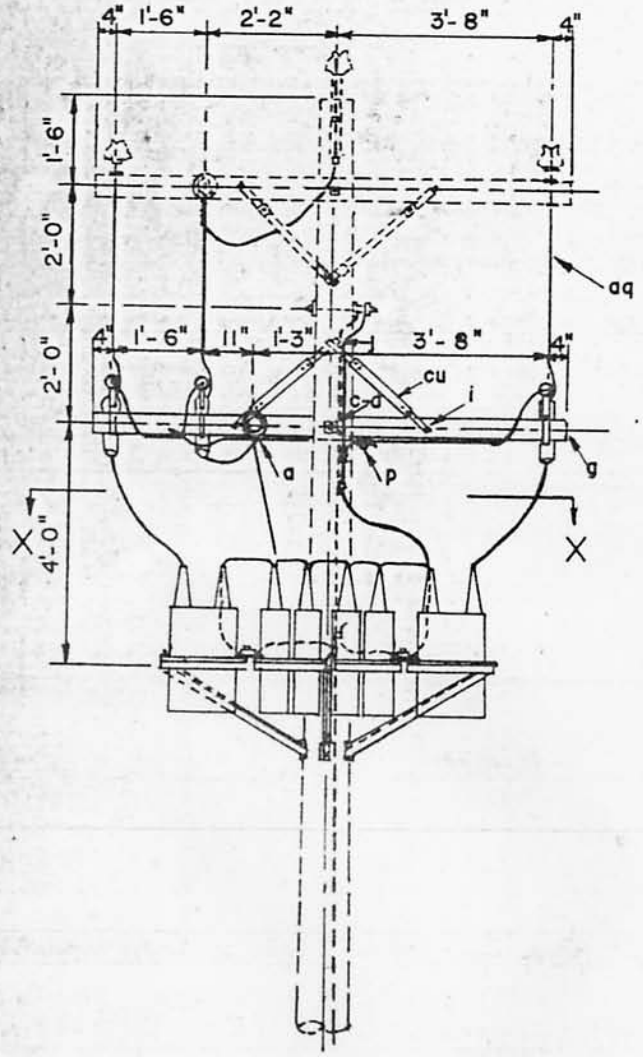
ITEM	NO.	MATERIAL
c	1	Bolt machine 5/8" x 14"
d	2	Washer 2 1/4" x 2 1/4" x 3/16", 13/16" hole
g	1	Crossarm, 3 1/2" x 4 1/2" x 8'-0"
cu	2	Bracewood, 28"
i	2	Bolt, carriage, 3/8" x 4 1/2"
j	1	Screw, lag 1/2" x 4"
fc		Capacitor KVA each
ek		Locknut 5/8"

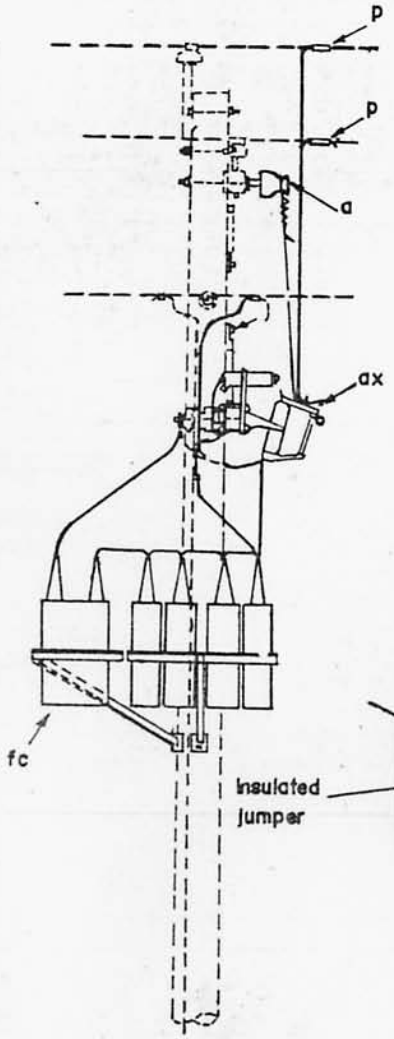
ITEM	NO.	MATERIAL
p	1	Connector, compression type
p		Connectors, as required
ae	1	Lightning arrester
af	1	Cutout fuse
aq		Jumpers or Leads 4 ACSR
dp	1	Clamp, ground wire, split bolt type
fd	1	Capacitor Hanger, pole mounted

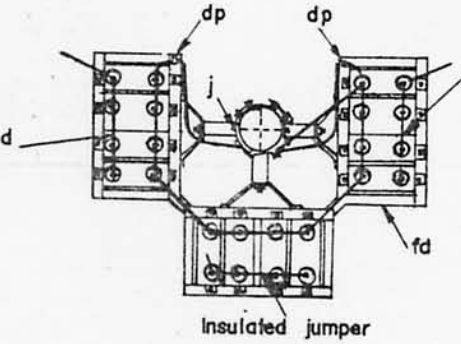
7.62 / 13.2 KV
SINGLE PHASE CAPACITOR ASSEMBLY

May 15, 1973

M9-11







SECTION X-X

ITEM	NO.	MATERIAL
c	1	Bolt, machine, 5/8" x 14"
d	2	Washer, 2 1/4" x 2 1/4" x 3/16", 13/16" hole
g	1	Crossarm, 3 1/2" x 4 1/2" x 8'-0"
i	2	Bolt, carriage, 3/8" x 4 1/2"
j	4	Screw, lag, 1/2" x 4"
p	3	Connector, compression type
p		Connector, as required
aq		Jumpers, as required
ax	3	Cutout and arrester combination
cu	2	Brace, wood, 28"
dp	2	Clamp, ground wire
ea	2	Insulator, post type, with 7" stud
fc		Capacitor KVA each
fd	1	Hanger, cluster type
ek	2	Locknuts 3/8"
a	1	Insulator, pin type
f	2	Pin, crossarm, steel 5/8" x 10-3/4"
ek	2	Locknuts 5/8"

Notes:

1. Specify number and KVAR required.
2. Load Break cutouts for installations over 75 KVAR/phase.
3. For V-Phase installations omit capacitors and related items on center phase. Designate as assembly M9-2.
4. Specify insulating caps for primary terminal bushings.

SUGGESTED FUSING TABLE

KVAR Connected to each Cutout	25	50	75	100	150
Fuse Size (Amp)	7	15	25	25	40

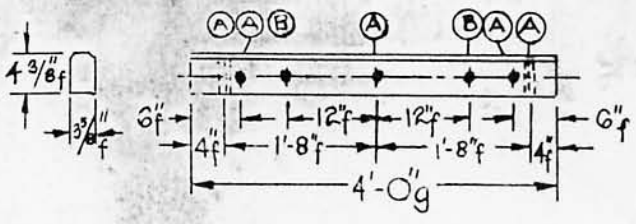
Note: Care must be taken to coordinate fuse with sectionalizing plan.

7.6 / 13.2 KV

TWO OR THREE PHASE CAPACITOR ASSEMBLY

May 15, 1973

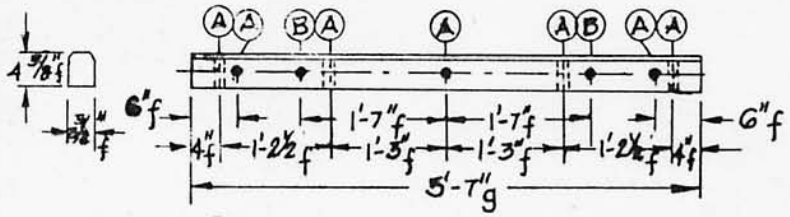
M9-12, M9-13



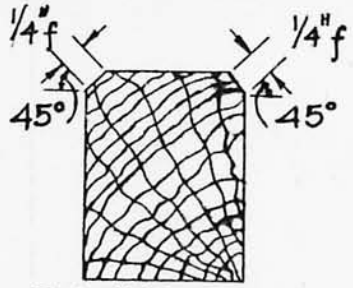
Type 01

Tolerance sizes of holes

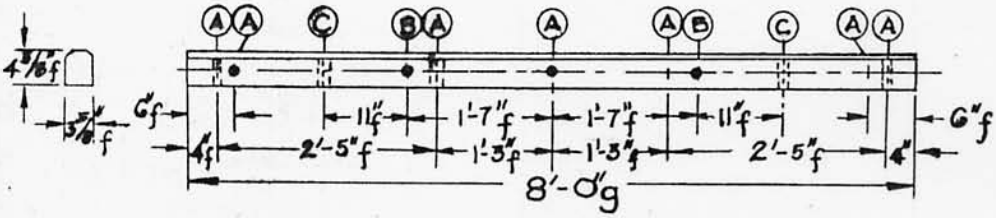
NOMINAL		GO	NO GO
A	11/16"	5/8"	3/4"
B	7/16"	3/8"	1/2"
C	9/16"	1/2"	5/8"



Type 02

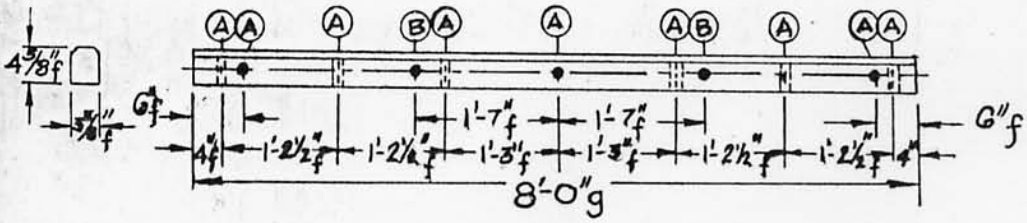


Typical Enlarge Section

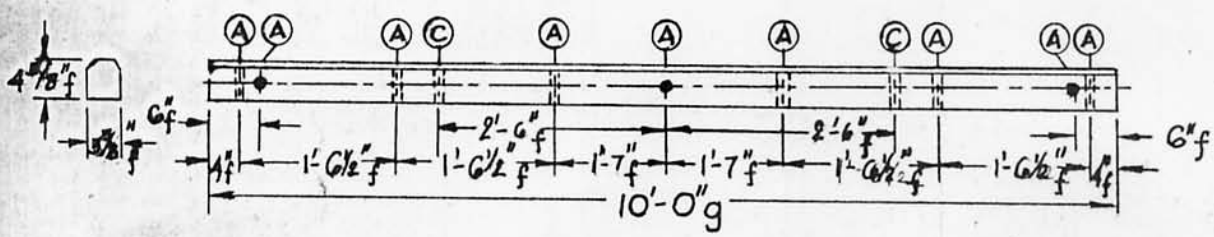


Type 03

f ---- 1/8" ±
g ---- 1/4" ±



Type 04

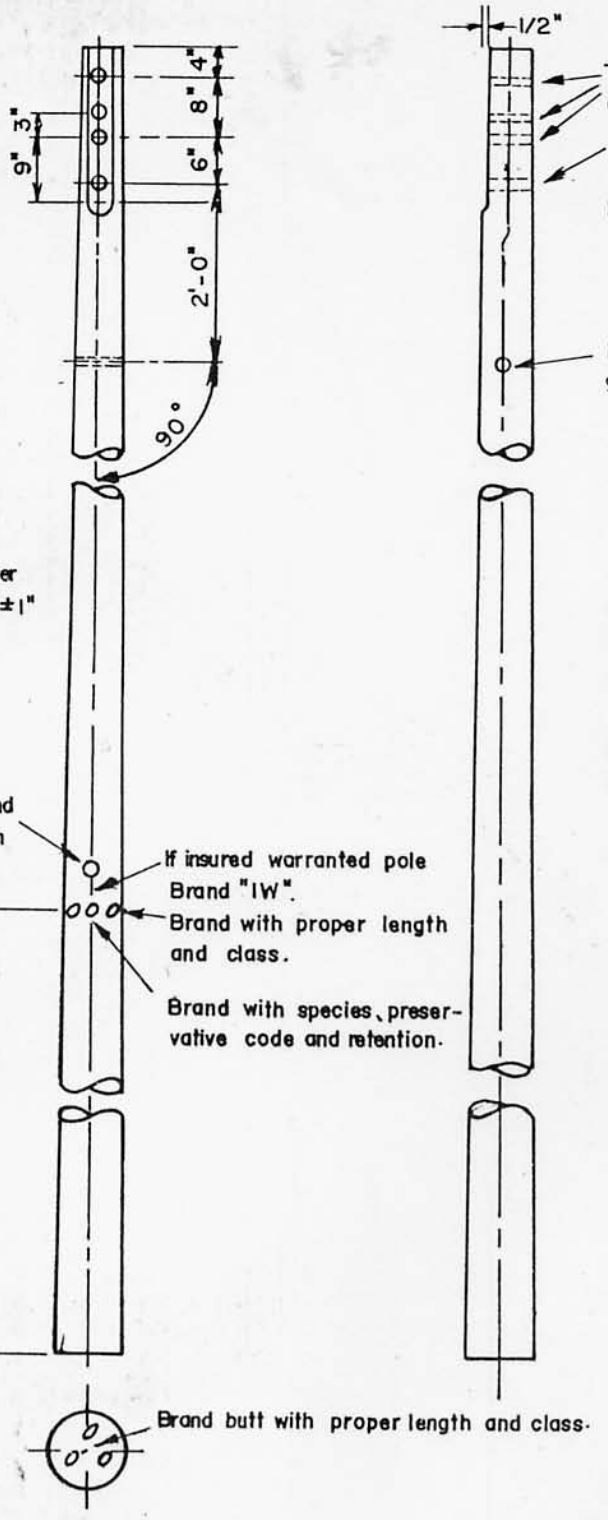


Type 05

CROSSARM DRILLING GUIDE

MAY 15, 1973

M-19



Thru bolt holes must be in parallel and in the same plane.

Holes -
Drill 11/16" diameter

Neutral bolt hole must be at 90° angle with thru bolt holes.

Gains -
Gains are to be flat with plane at right angles to bolt hole

All poles treated full length must be bored, roofed, and gained before treatment, except that Class 7 and smaller poles need not be gained unless requested by purchaser. Roofs may be flat or at a 15° angle at the producer's option.

Bottom of brand or center of metal disk shall be 10'±1" from the butt.

Manufacturer's Mark and Date of Treatment (Month and Year)

If insured warranted pole Brand "IW".

Brand with proper length and class.

Brand with species, preservative code and retention.

Brand butt with proper length and class.

Note:
14'±1" mark for poles 55' and longer

POLE FRAMING GUIDE

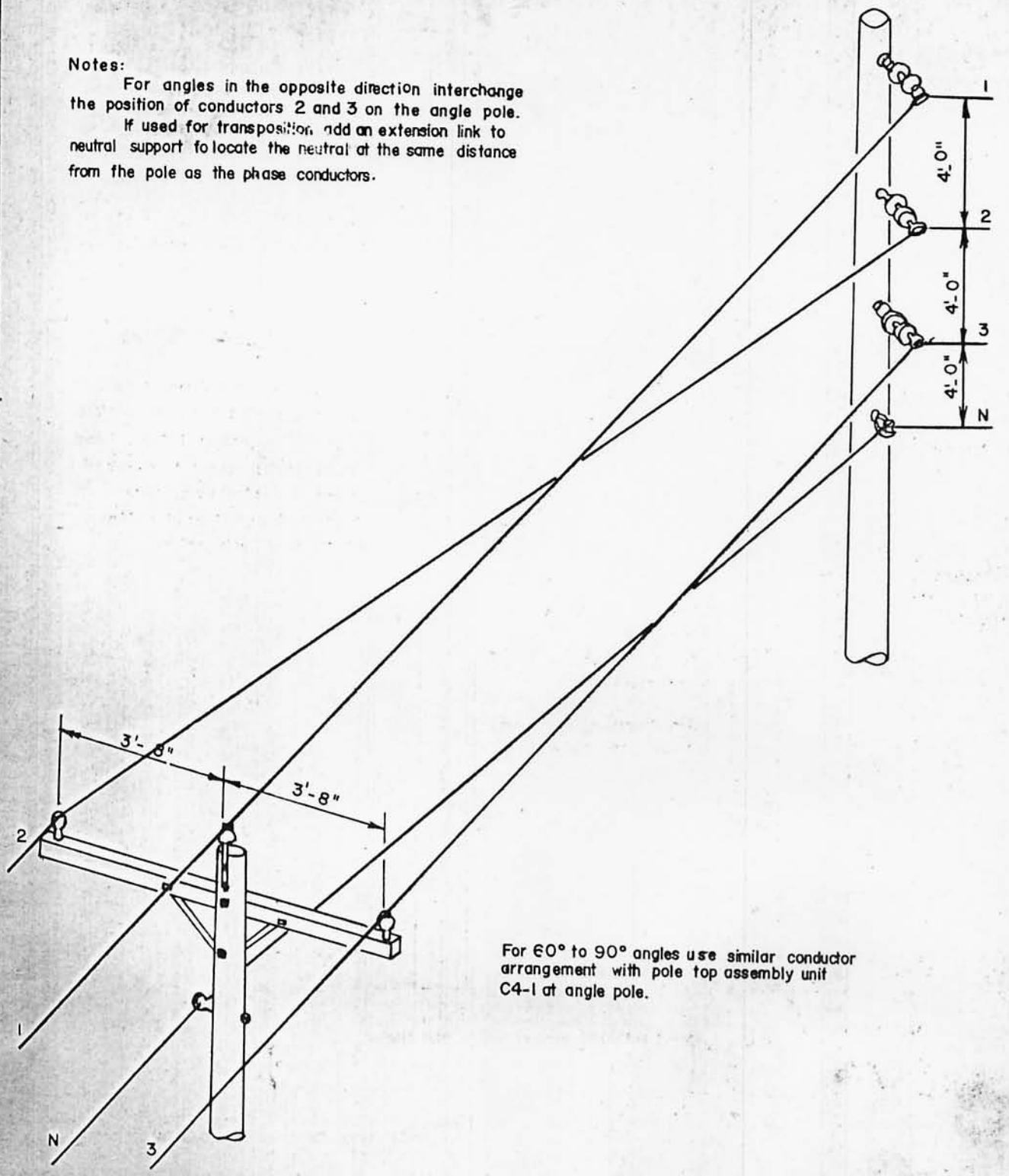
May 15, 1973

M20

Notes:

For angles in the opposite direction interchange the position of conductors 2 and 3 on the angle pole.

If used for transposition, add an extension link to neutral support to locate the neutral at the same distance from the pole as the phase conductors.



For 60° to 90° angles use similar conductor arrangement with pole top assembly unit C4-1 at angle pole.

ANGLE CONSTRUCTION GUIDE
CROSSARM TO VERTICAL CONST. 30° TO 60° ANGLE

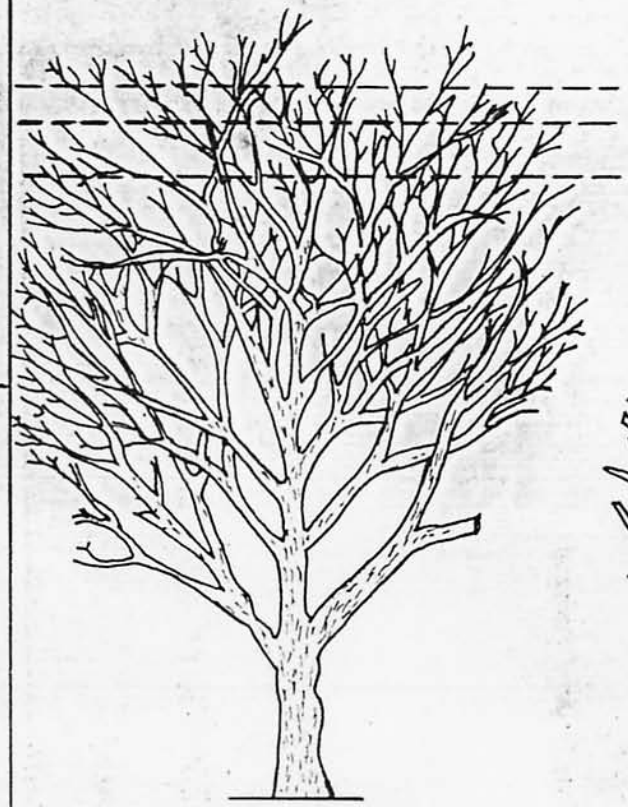
May 15, 1973

M21

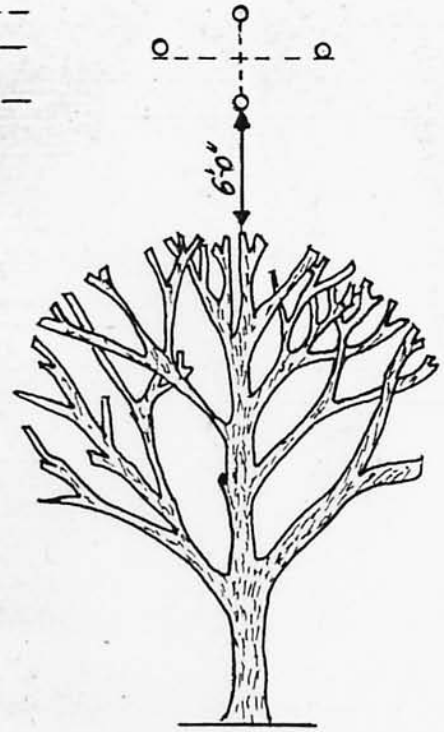
TREE TRIMMING GUIDE

May 15, 1973

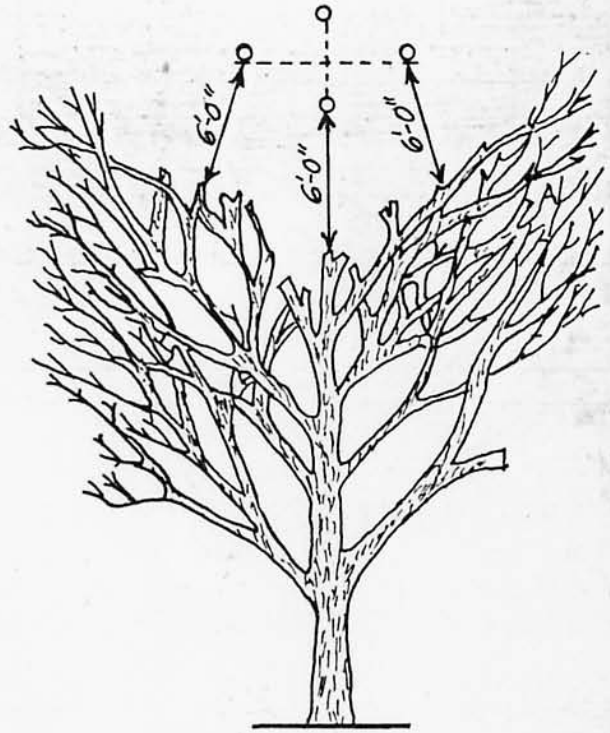
M22-1



Before Trimming



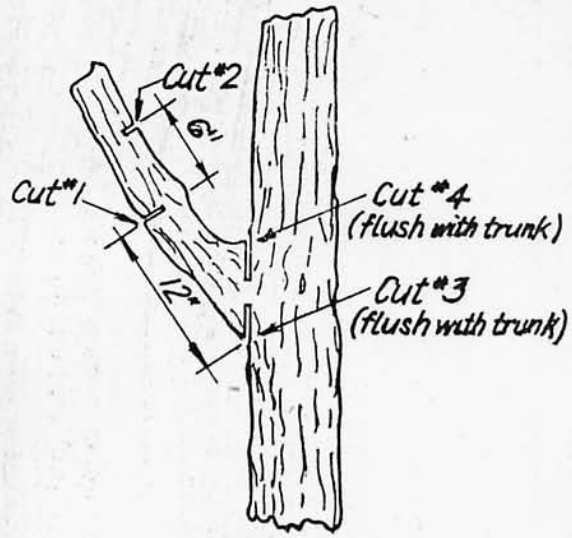
Right Way



Wrong Way

Note:

No parts of tree should be closer than 6'-0" from open wiring. Trimming should leave tree with symmetrical appearance.

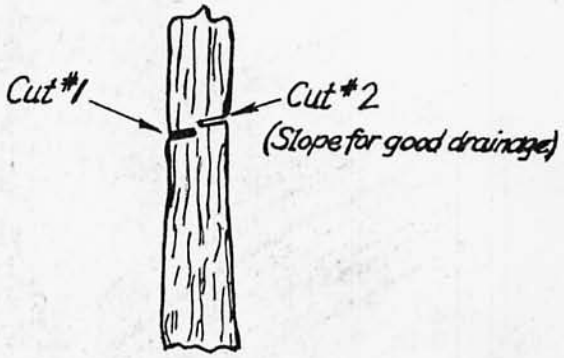


Right Way

Wrong Way

For small branches
omit Cuts #1 and #2

REMOVAL OF HEAVY SIDE LIMB



Right Way

Wrong Way

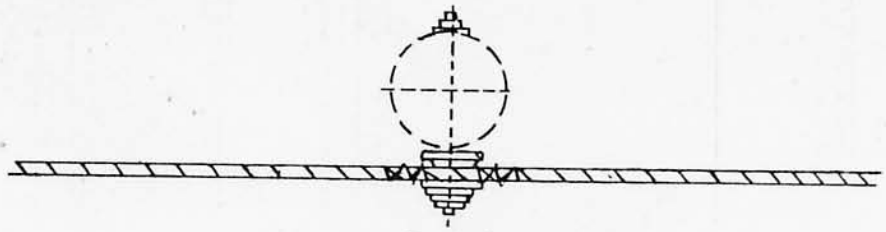
REMOVAL OF VERTICAL LIMB

NOTE: Coat final cut with tree paint.

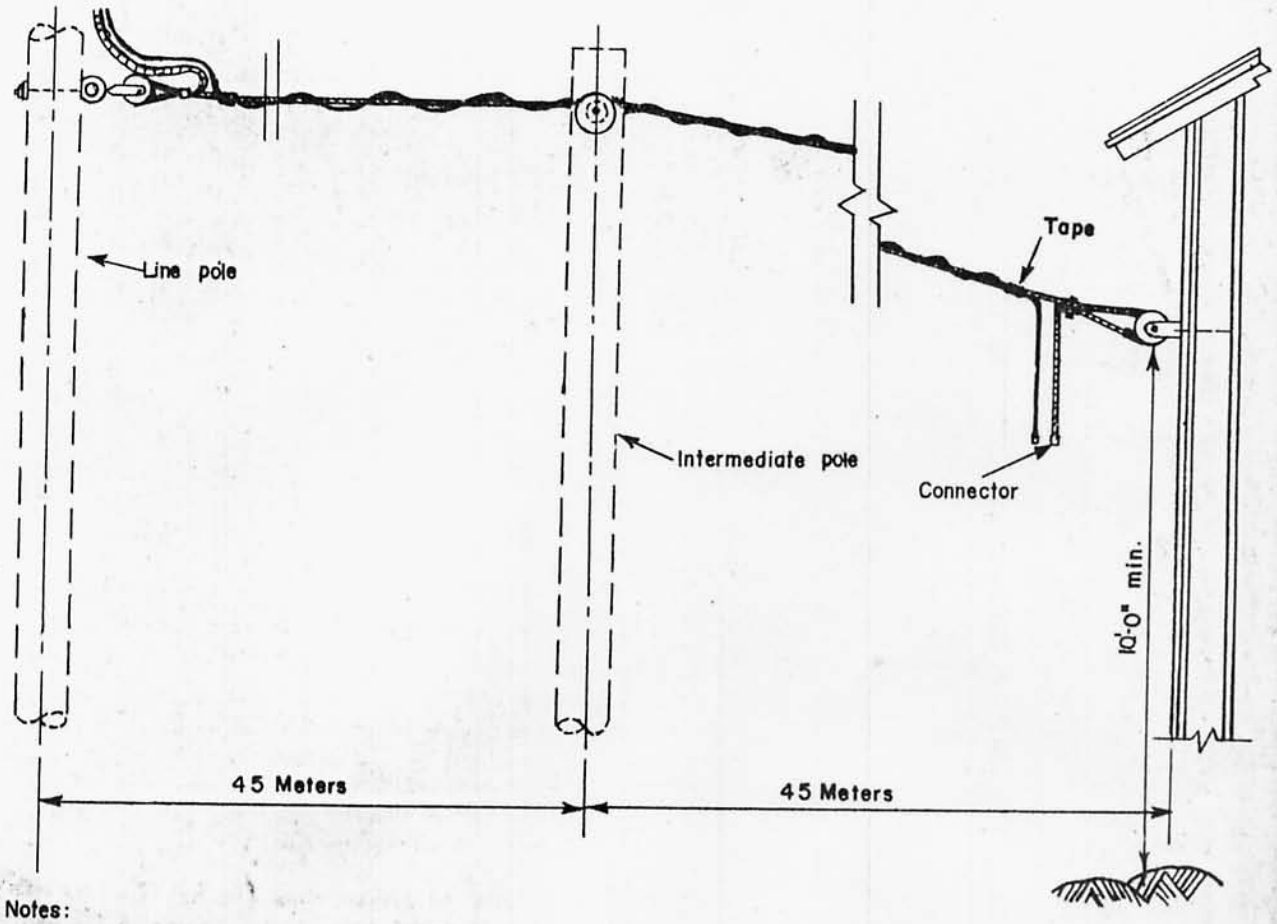
TREE TRIMMING GUIDE

May 15, 1973

M22-2



PLAN



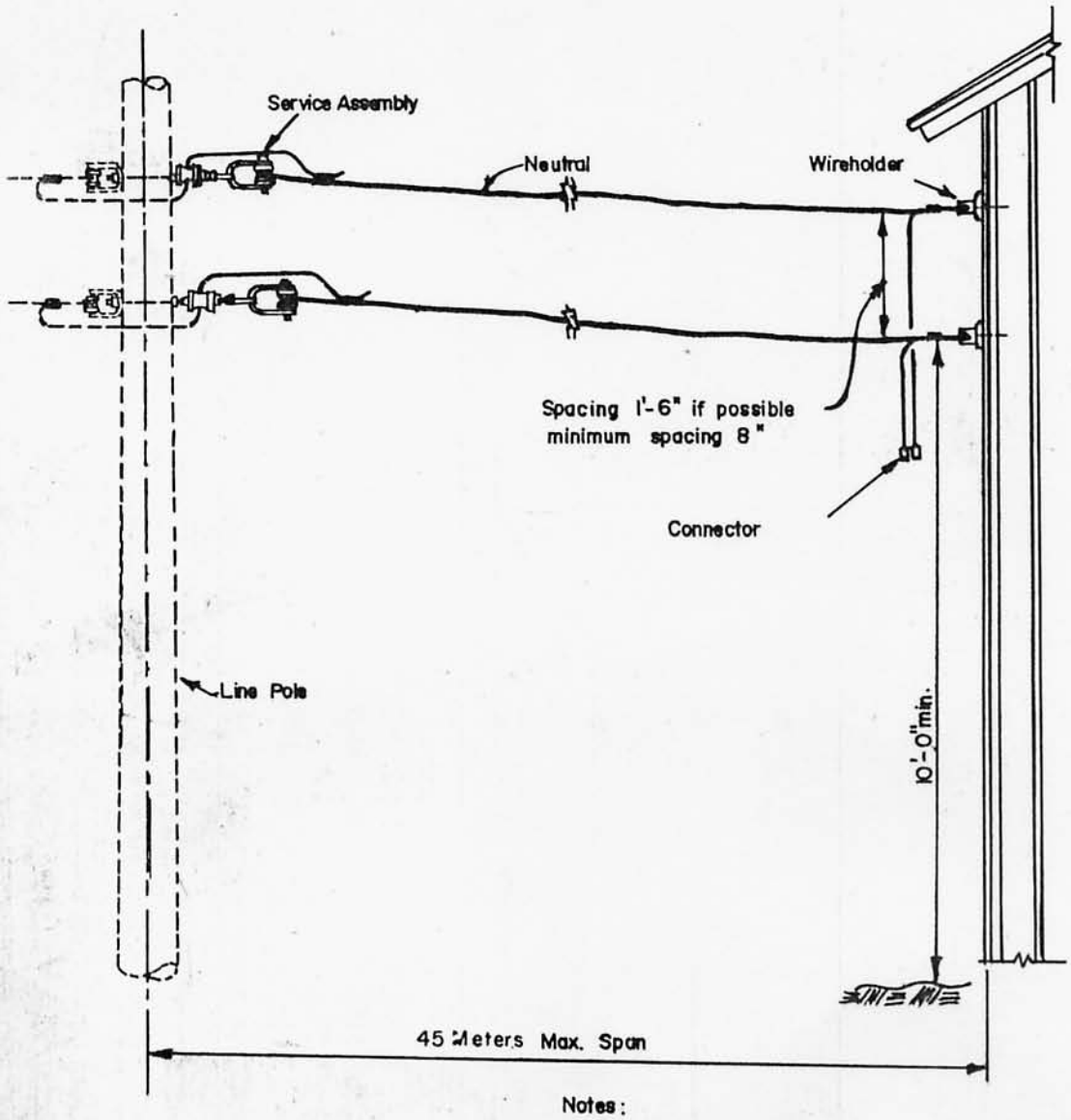
Notes:

1. Services as short as possible are preferred.
2. Refer to secondary and service assemblies for construction details.

CABLE SERVICE ASSEMBLY GUIDE

May 15, 1976

M 24



Notes:

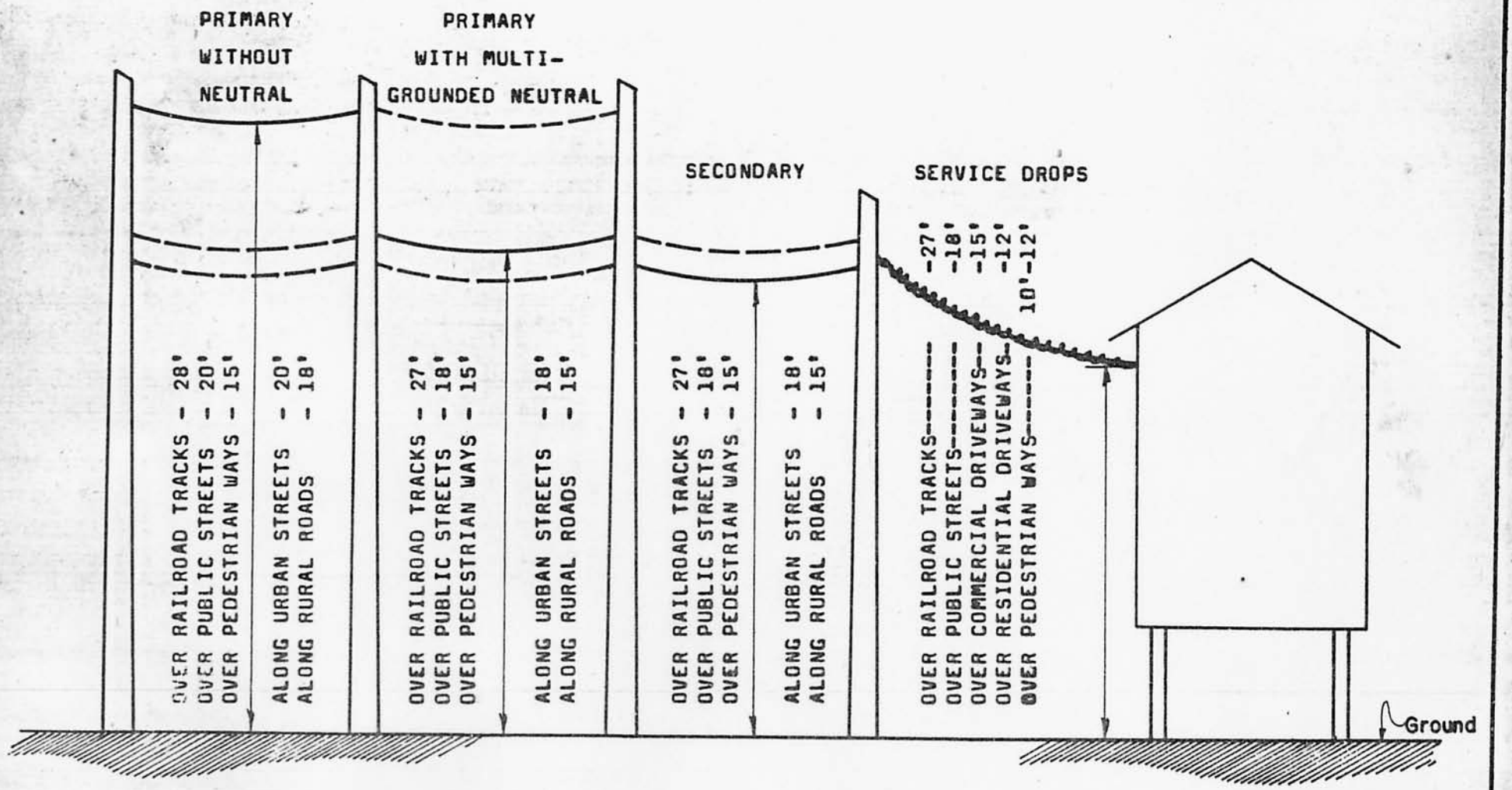
Insulation on covered conductor that is under strain should not be cut.

In brick or concrete walls use 3/8" expansion bolts or shields in 5/8" holes at least 2 1/2" deep, or wedge expanded eyebolts.

OPEN WIRE
SERVICE ASSEMBLY GUIDE

May 15, 1973

M24-1

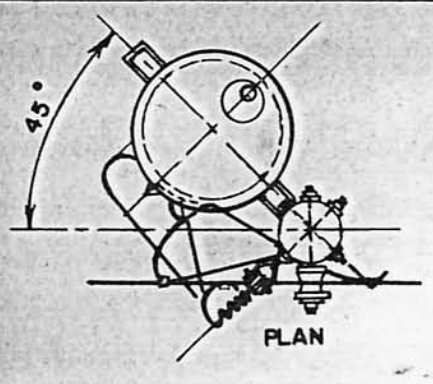

PRIMARY WITHOUT NEUTRAL
PRIMARY WITH MULTI-GROUNDED NEUTRAL
SECONDARY
SERVICE DROPS
OVER RAILROAD TRACKS - 28'
OVER PUBLIC STREETS - 20'
OVER PEDESTRIAN WAYS - 15'
ALONG URBAN STREETS - 20'
ALONG RURAL ROADS - 18'
OVER RAILROAD TRACKS - 27'
OVER PUBLIC STREETS - 18'
OVER PEDESTRIAN WAYS - 15'
ALONG URBAN STREETS - 18'
ALONG RURAL ROADS - 15'
OVER RAILROAD TRACKS - 27'
OVER PUBLIC STREETS - 18'
OVER PEDESTRIAN WAYS - 15'
ALONG URBAN STREETS - 18'
ALONG RURAL ROADS - 15'
OVER RAILROAD TRACKS ------ -27'
OVER PUBLIC STREETS ------ -18'
OVER COMMERCIAL DRIVEWAYS -- -15'
OVER RESIDENTIAL DRIVEWAYS - -12'
OVER PEDESTRIAN WAYS ------ 10'-12'
Ground

PRIMARY VOLTAGE : 750 VOLTS to 15,000 VOLTS
SECONDARY VOLTAGE : 0 - 750 VOLTS
SERVICE DROP VOLTAGE: 0 - 750 VOLTS

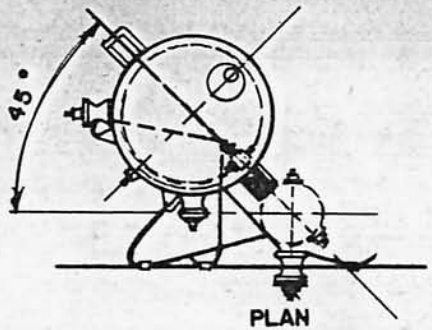
BASIC MINIMUM CLEARANCES

July 1, 1976

M24-2



PLAN



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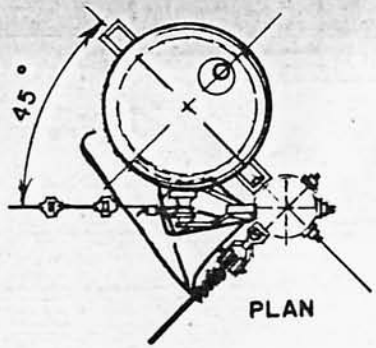

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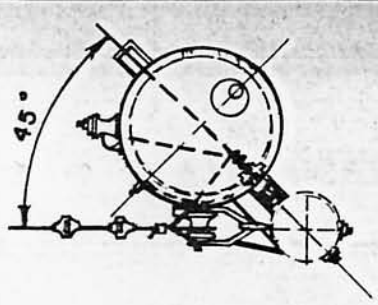
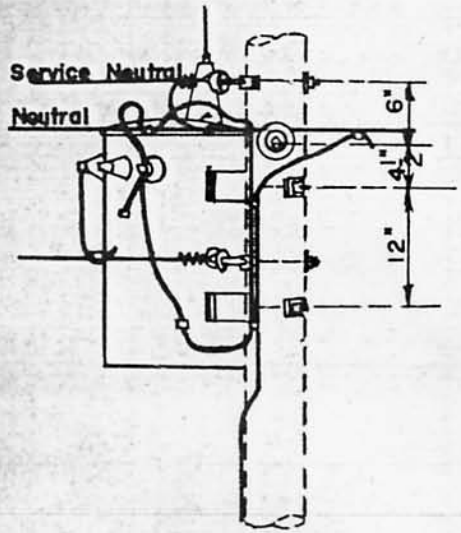
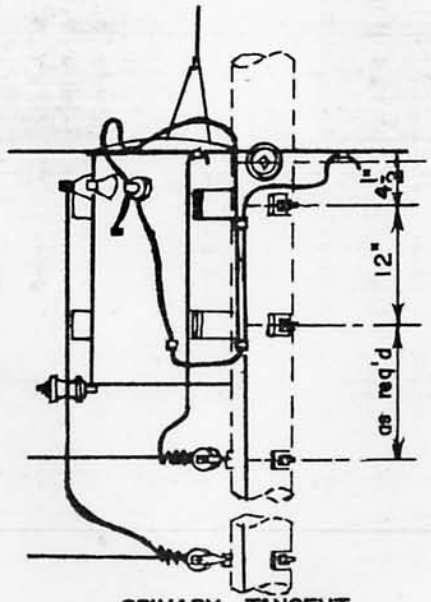


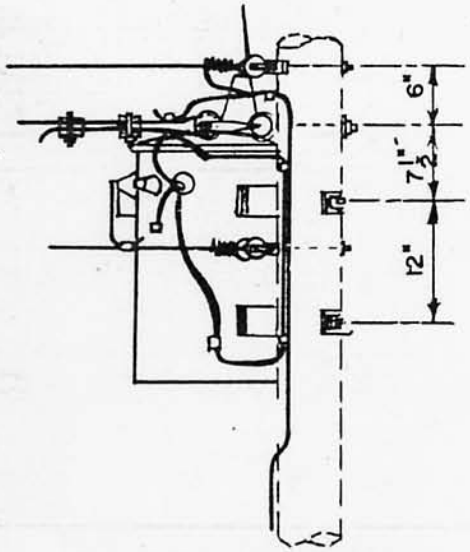
PLAN



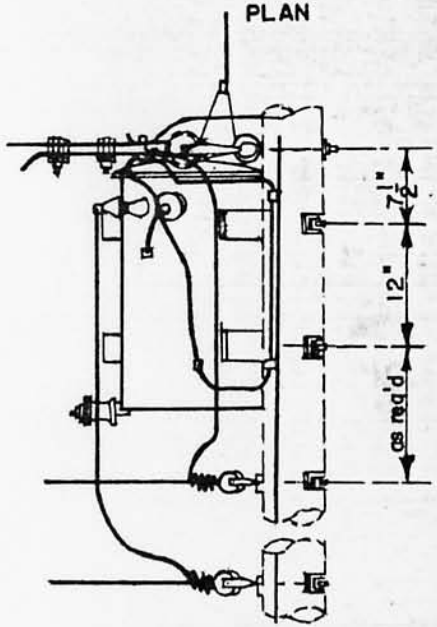
PRIMARY TANGENT
SERVICE TAKE-OFF
AT TRANSFORMER LEVEL



PRIMARY TANGENT
SERVICE TAKE-OFF BELOW
TRANSFORMER



PRIMARY DEADEND
SERVICE TAKE-OFF AT
TRANSFORMER LEVEL



PRIMARY DEADEND
SERVICE TAKE-OFF BELOW
TRANSFORMER

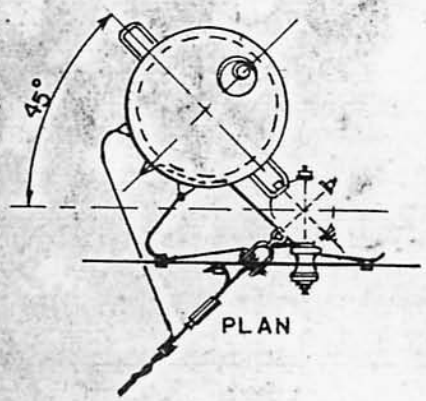
Note :

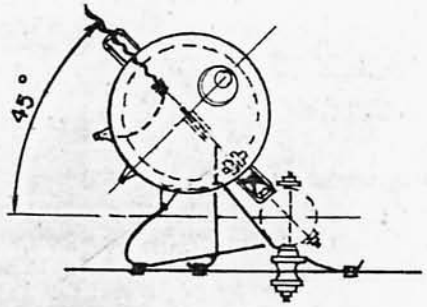
Transformers may be mounted in alternate positions and quadrants as practical in order to facilitate services in directions not shown.

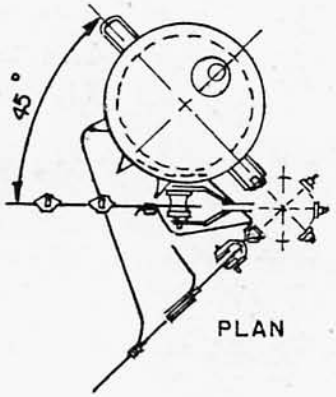
TRANSFORMER CONNECTION GUIDE

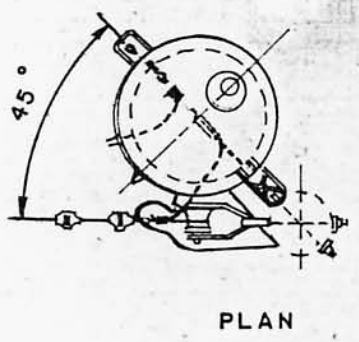
OPEN WIRE SERVICES

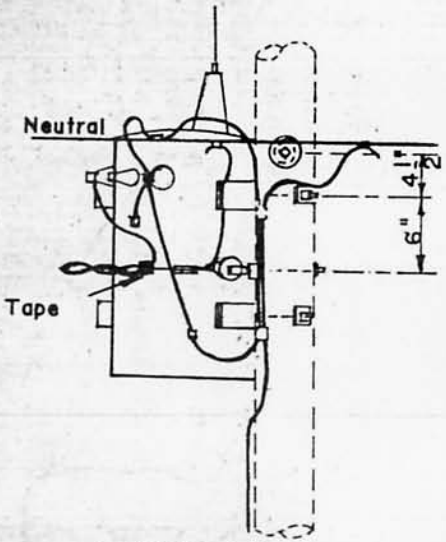
May 15,1973 | M27



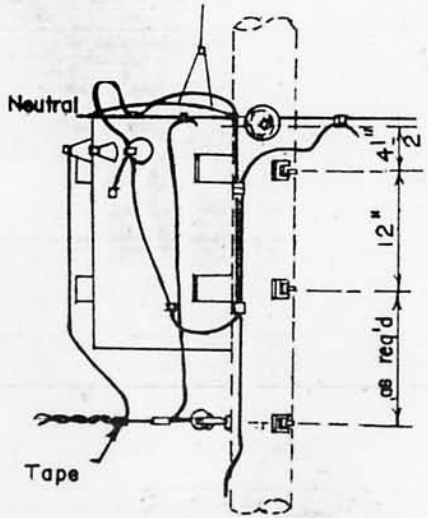




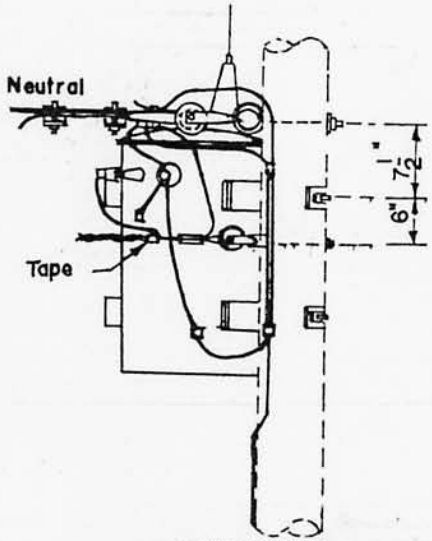




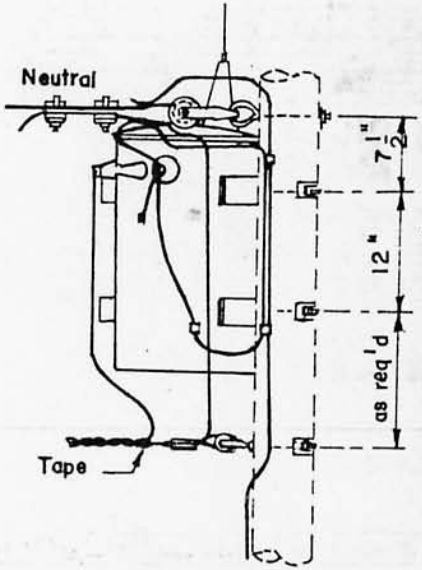
PRIMARY TANGENT
SERVICE TAKE – OFF
AT TRANSFORMER



PRIMARY TANGENT
SERVICE TAKE – OFF
BELOW TRANSFORMER



PRIMARY DEADEND
SERVICE TAKE-OFF AT
TRANSFORMER



PRIMARY DEADEND
SERVICE TAKE-OF BELOW
TRANSFORMER

Notes:

1 Transformers may be mounted in alternate positions and quadrants as practical in order to facilitate services in directions not shown.

2 Service neutral must be connected directly to system neutral.

TRANSFORMER CONNECTION GUIDE
TRIPLEX CABLE SERVICES

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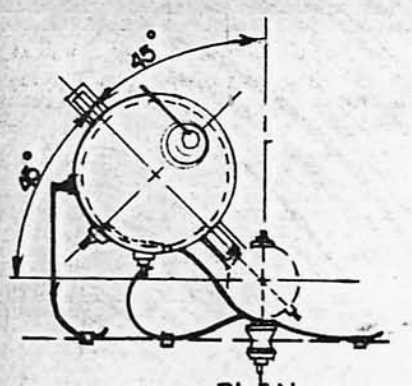
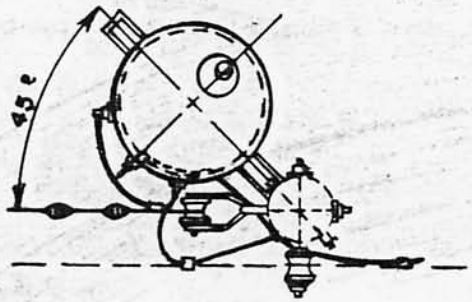
M27-1



PLAN



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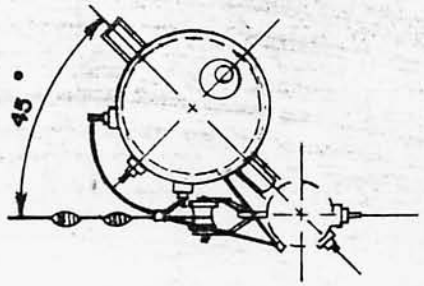
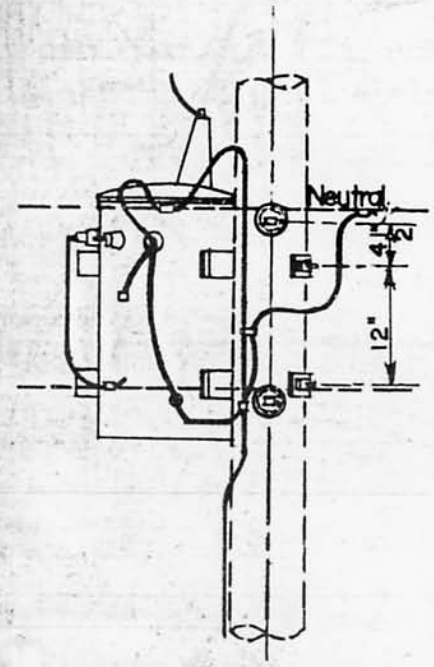
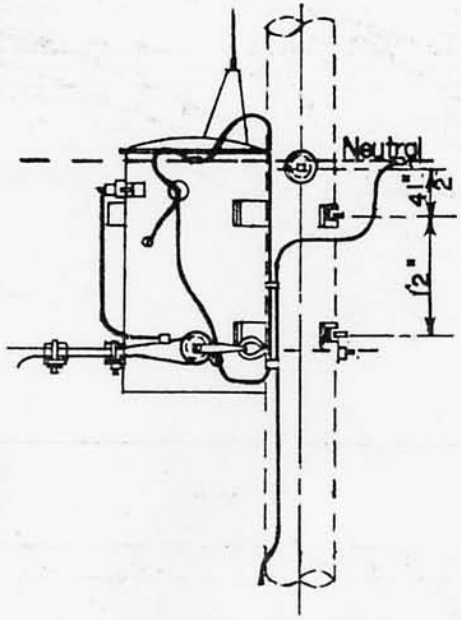


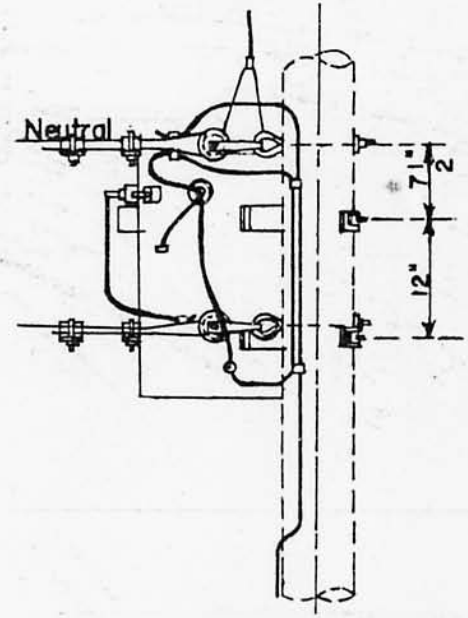
PLAN



PRIMARY TANGENT
SECONDARY TANGENT



PRIMARY TANGENT
SECONDARY TANGENT

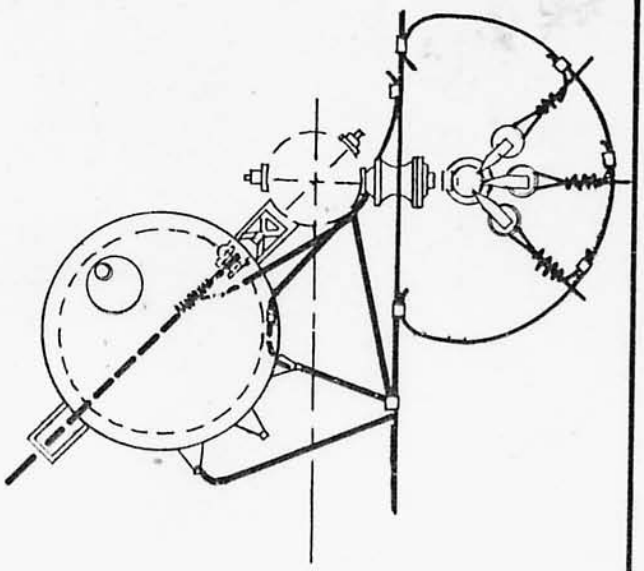


PRIMARY DEADEND
SECONDARY DEADEND

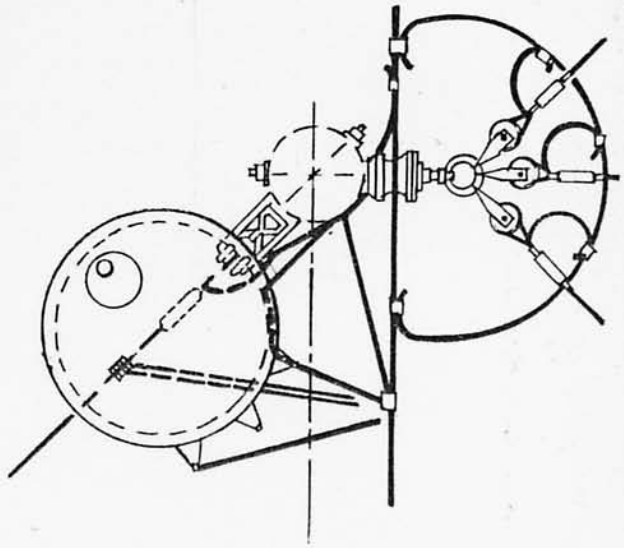
TRANSFORMER CONNECTION GUIDE SECONDARY UNDERBUILD

MAY 15, 1973

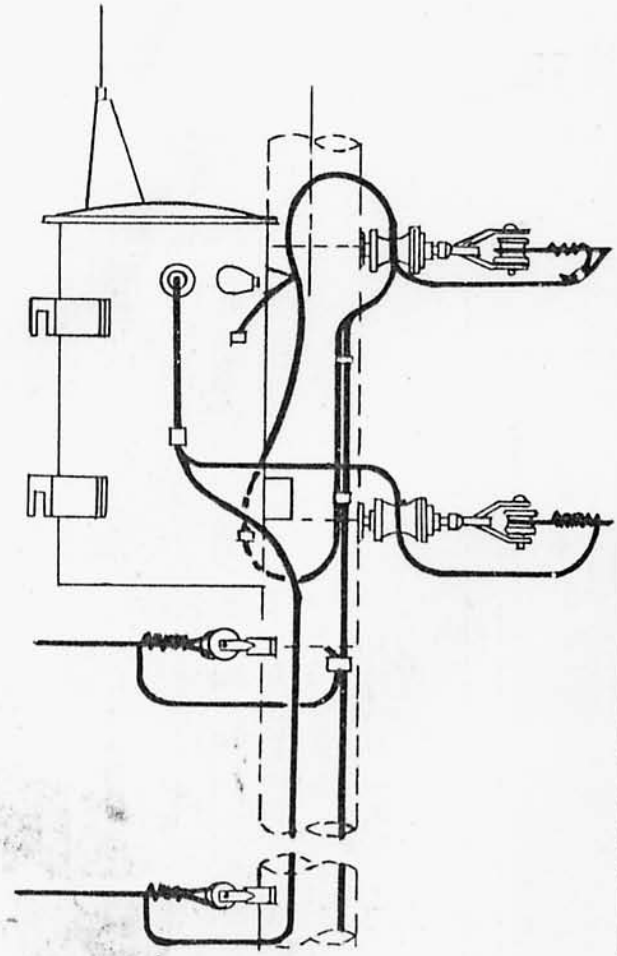
M27-2



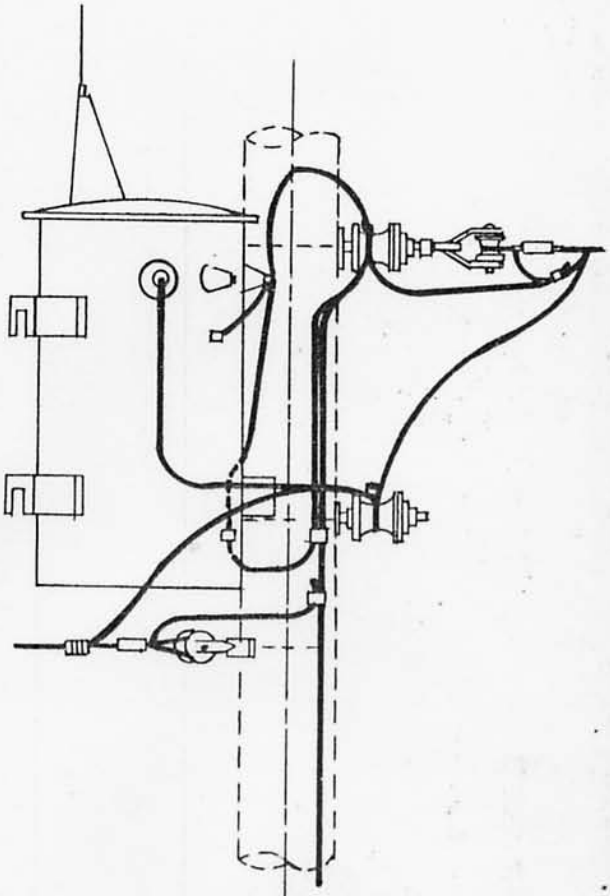
PLAN



PLAN



OPEN WIRE



DUPLEX CABLE

TRANSFORMER CONNECTION AND SERVICE TAKE-OFF GUIDE FROM SECONDARY

MAY 15,1973

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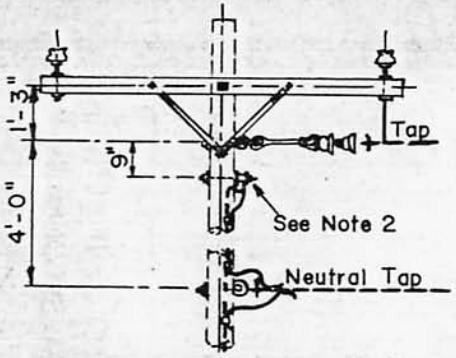
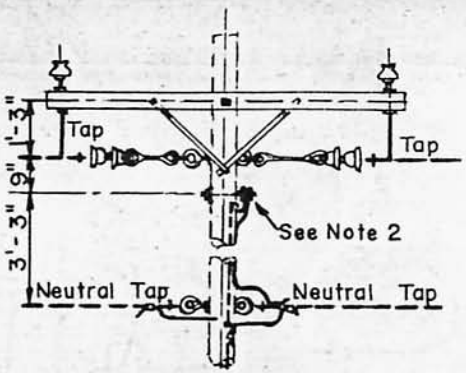


COMPLETE ASSEMBLY

A5-2 AND B1

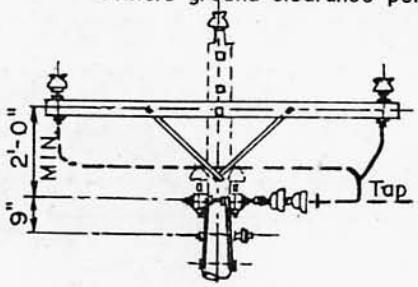


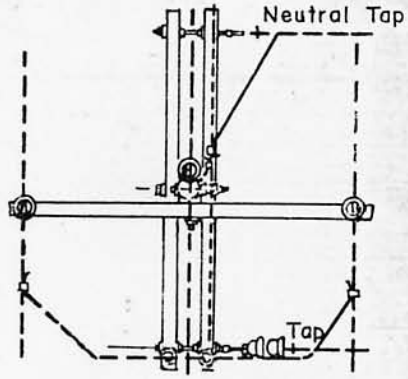
COMPLETE ASSEMBLY

A5-2, A5-2A AND B1

Notes:

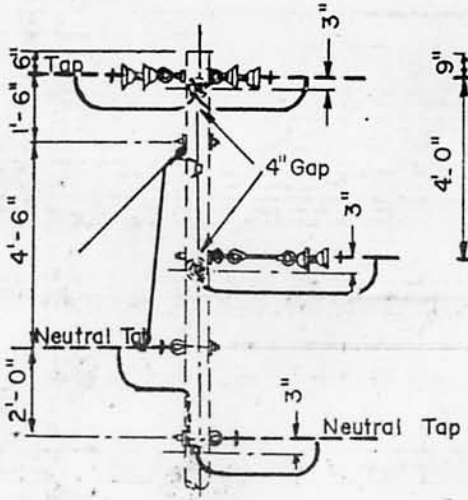
1. Maintain 2" minimum spacing between ground wire and hardware associated with energized conductors.
2. Where ground clearance permits mount all neutrals at lower level.





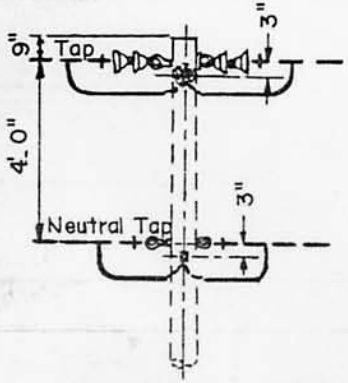
COMPLETE ASSEMBLY

C1, A7 AND M5-5



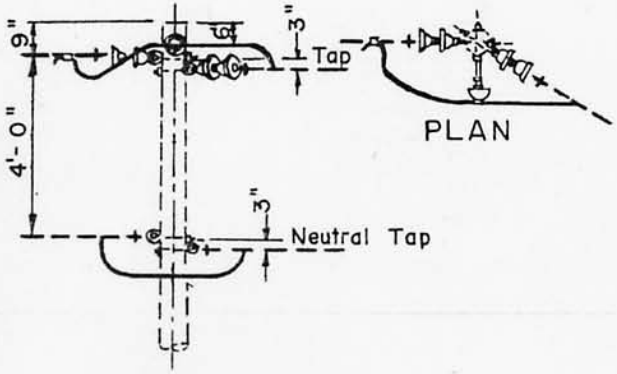
COMPLETE ASSEMBLY

A5-3 AND B4-1



COMPLETE ASSEMBLY

A5-3 AND A4



COMPLETE ASSEMBLY

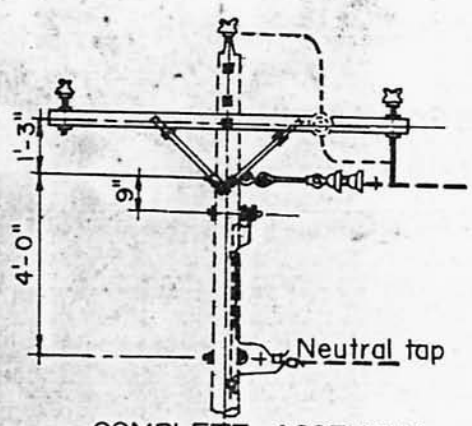
A5-1, M5-4 AND A5

TAP ASSEMBLY GUIDE

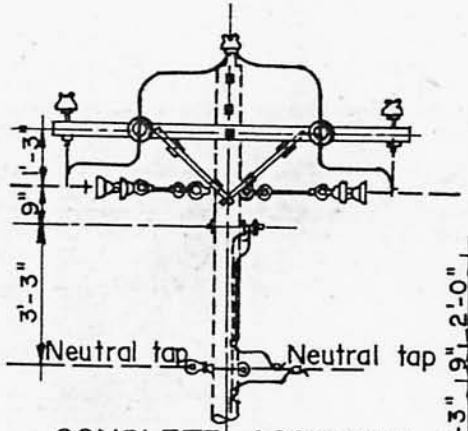
MAY 15, 1973		M29-1

Notes:

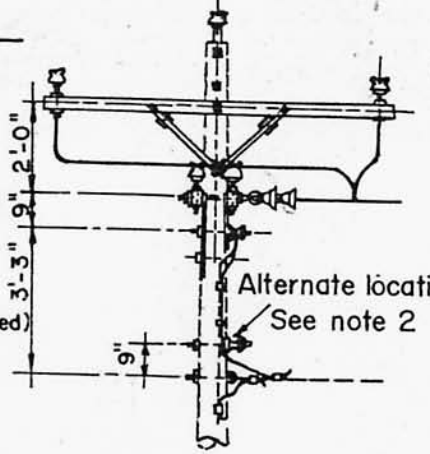
1. Maintain 2" minimum spacing between ground wire and hardware associated with energized conductors.
2. Where ground clearance permits mount all neutrals at lower level.

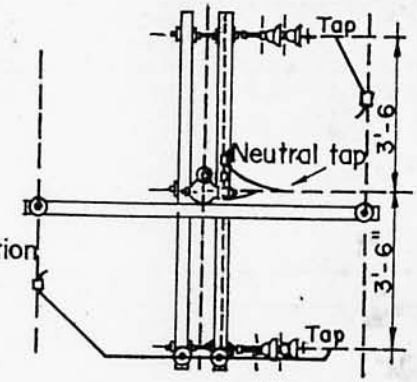


COMPLETE ASSEMBLY
A5-2, C1 AND M5-7 (If needed)

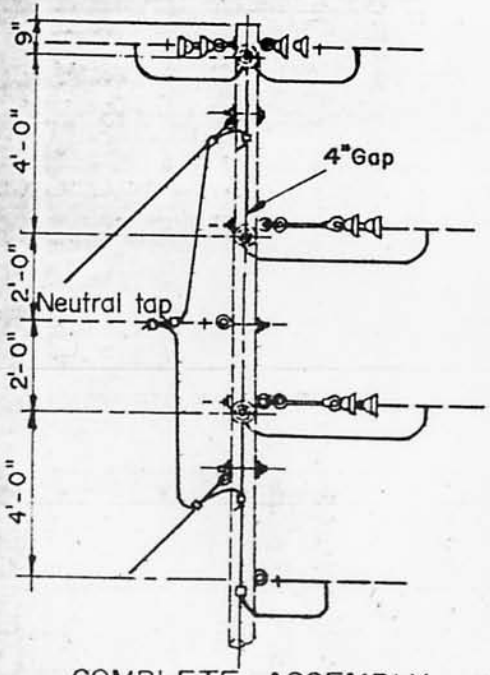


COMPLETE ASSEMBLY
A5-2, A5-2A, C1 AND M5-7 (If needed)

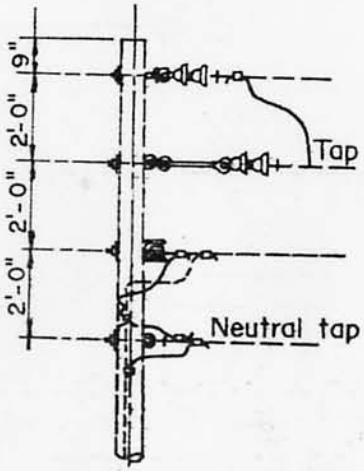




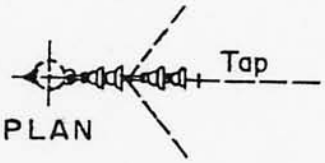
COMPLETE ASSEMBLY
C1, B7 AND M5-5



COMPLETE ASSEMBLY
A5-3 AND C4-1



COMPLETE ASSEMBLY
A5-2 AND A3

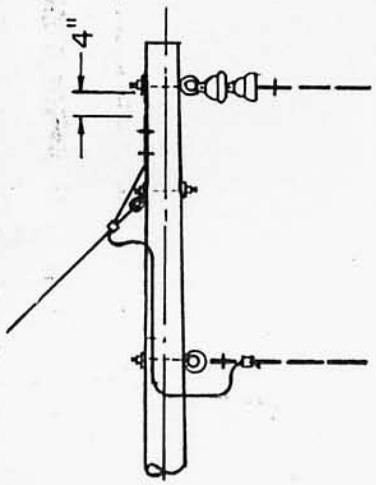


PLAN

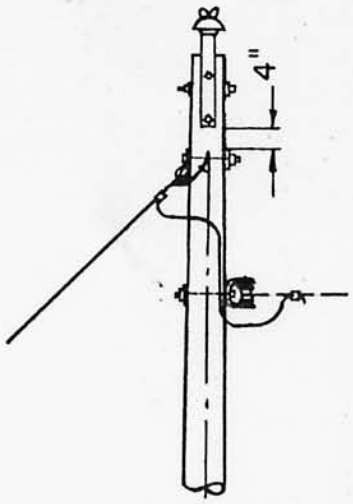
TAP ASSEMBLY GUIDE

MAY 15, 1973

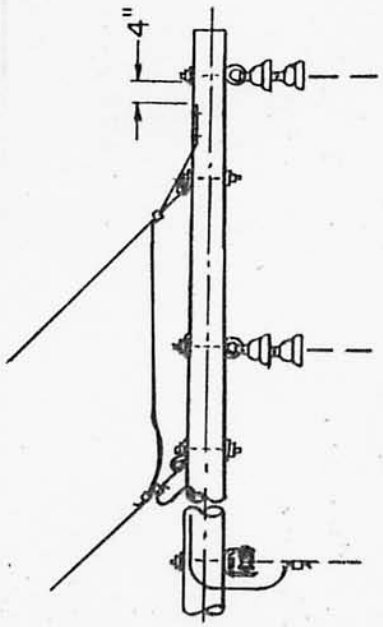
M29-2



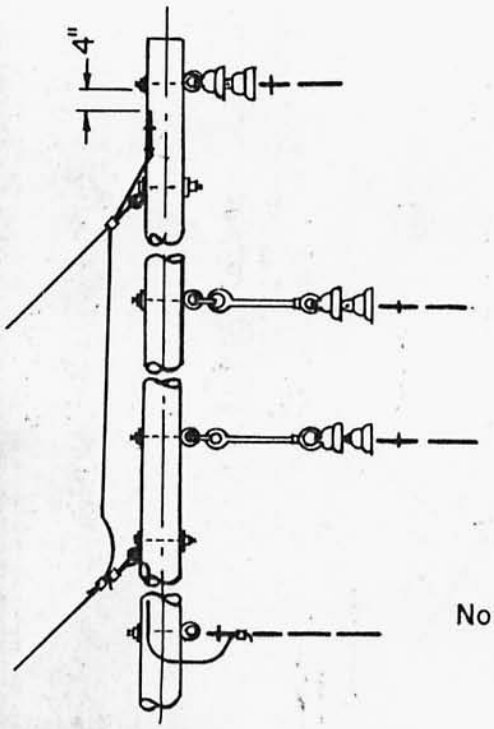
AT SINGLE PHASE ANGLES AND DEADENDS



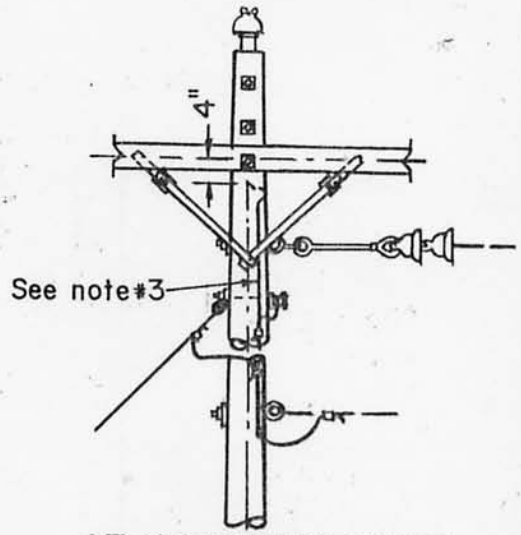
AT SINGLE PHASE ANGLES



AT V-PHASE ANGLES AND DEADENDS



AT THREE PHASE ANGLES AND DEADENDS

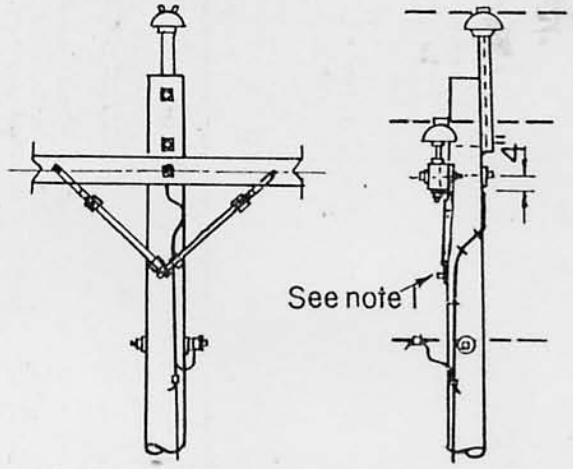


AT V OR THREE PHASE TAP ASSEMBLY

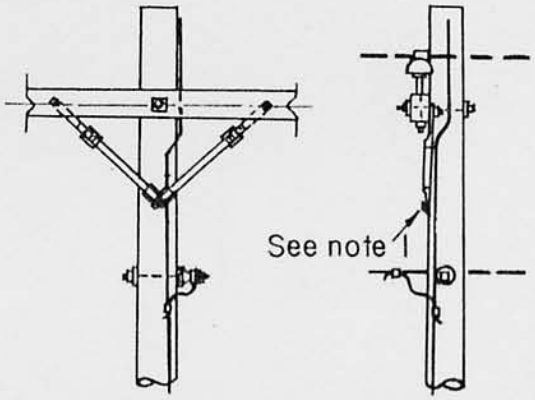
Notes:

1. Maintain 2" minimum spacing between ground wire and hardware associated with energized conductors.
2. An M2-12 ground assembly may be added if desired.
3. Position of staple is important. Maintain 4" minimum distance from staple or clip to lag screw or eye bolt.

GUIDE FOR INSTALLATION OF GROUND WIRE ABOVE NEUTRAL ON GUYED POLES		
MAY 15, 1973		M30 - 1



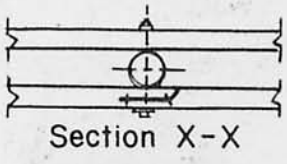
AT SINGLE ARM ASSEMBLIES WITH POLE TOP PIN

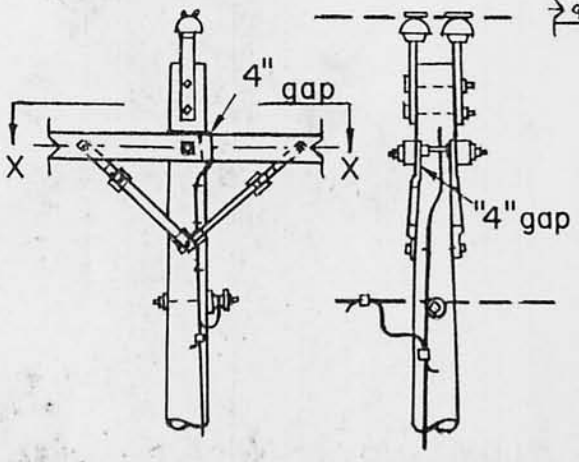


AT SINGLE ARM ASSEMBLIES WITHOUT POLE TOP PIN

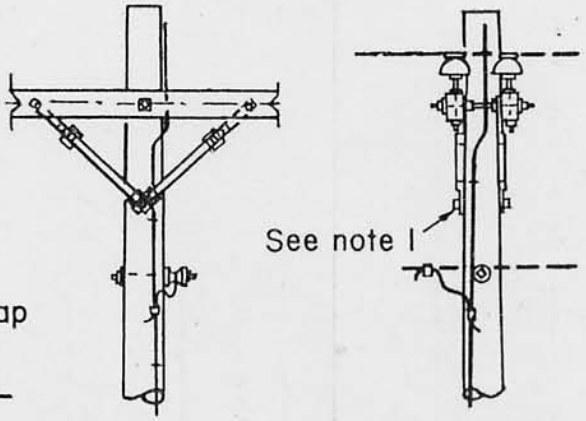
Notes:

1. Position of staple is important. Maintain 4" min. distance from staple or clip to lag screw or eye bolt.
2. Maintain 2" min. spacing between ground wire and hardware associated with energized conductors.





AT DOUBLE ARM ASSEMBLIES WITH POLE TOP PINS

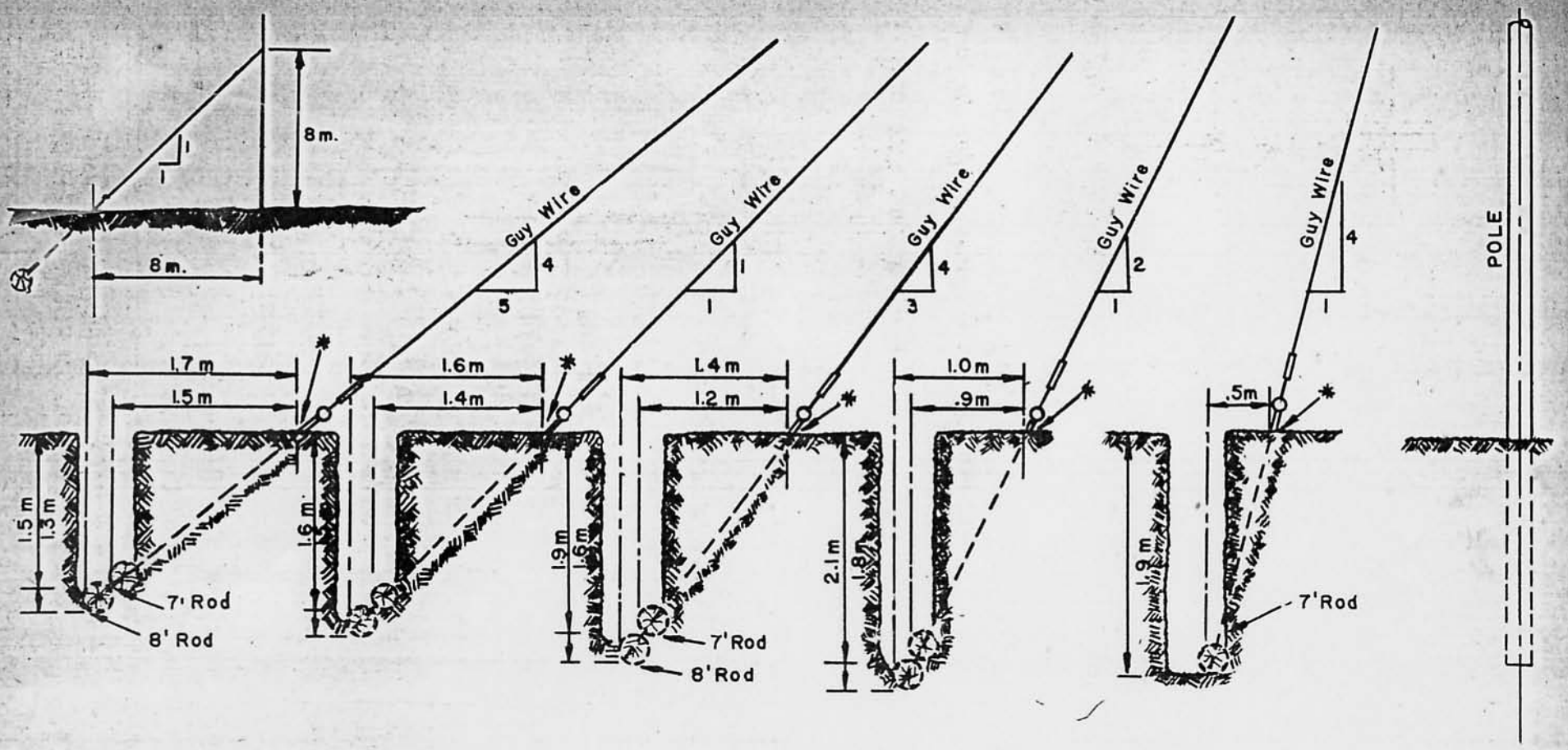


AT DOUBLE ARM ASSEMBLIES WITHOUT POLE TOP PINS

GUIDE FOR INSTALLATION OF GROUND WIRE ABOVE NEUTRAL ON POLES WITH BUTT WRAPPED OR DRIVEN GROUNDS

MAY 15, 1973

M30-2



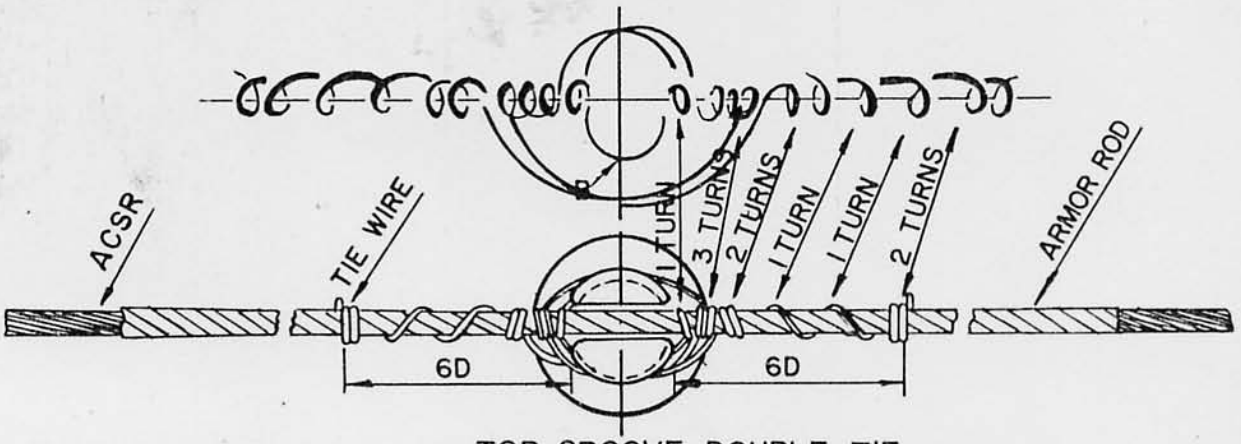
NOTES:

1. See Construction Drawing F2-1 to F2-4 for details and materials.
2. * Indicates location of anchor stake.

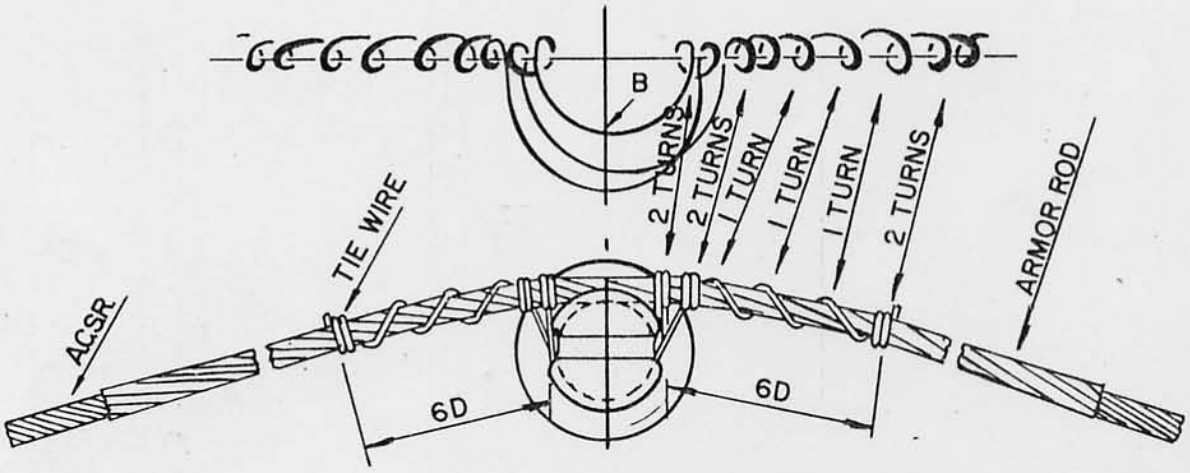
LOG ANCHOR INSTALLATION GUIDE

MAY 15, 1973

M30 – 3



TOP GROOVE DOUBLE TIE



SIDE GROOVE TIE

NOTE:

In making ties, start with middle of length of tie wire at position marked "B"

To complete tie, cinch up last two turns at each end with pliers until tie wire is snug and tight.

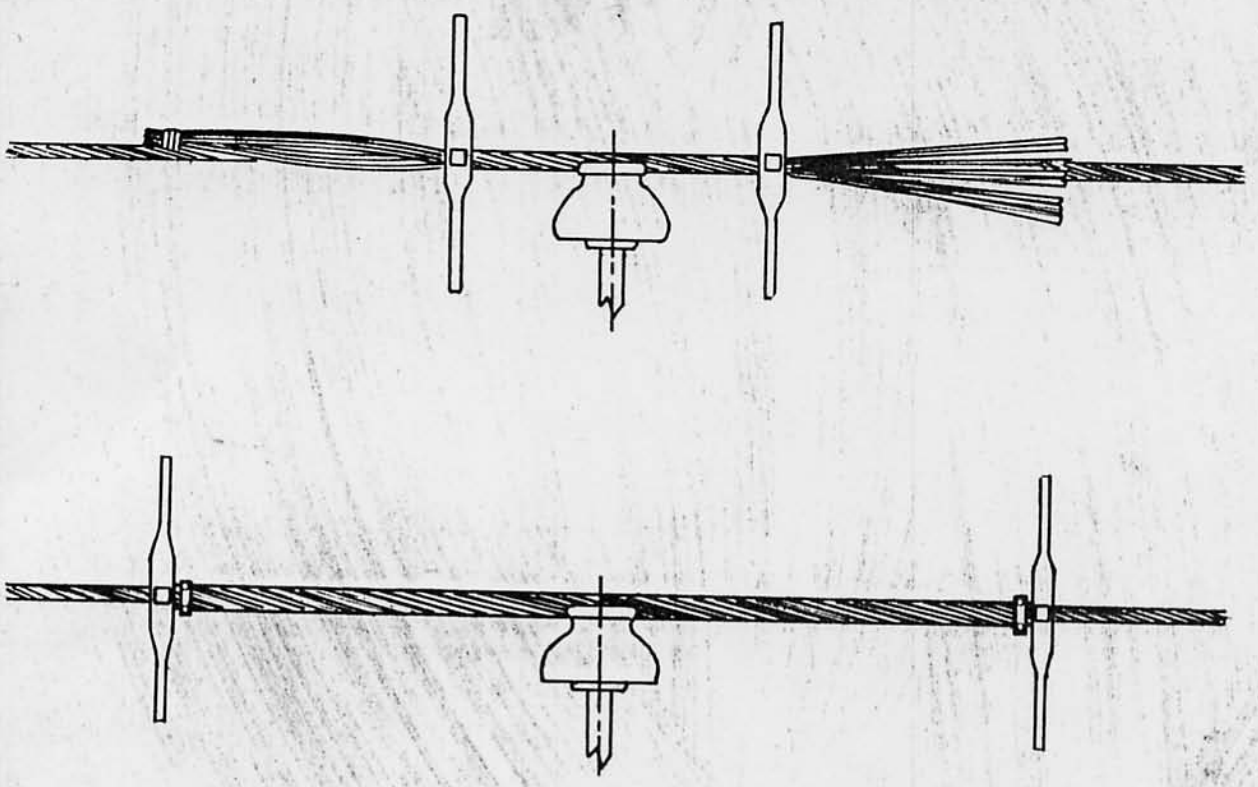
Use the flat face of the pliers against the armor rods.

A. C. S. R.		ARMOR RODS	TIE WIRE ALUMINUM		A. C. S. R.		ARMOR RODS	TIE WIRE ALUMINUM	
SIZE	DIAM. INCHES	"D" DIAM. INCHES	SIZE	LENGTH FEET	SIZE	DIAM. RODS	"D" DIAM. INCHES	SIZE	LENGTH FEET
4/0	0.563	0.939	4	9' 3"	1/0	0.398	0.744	4	8' 3"
3/0	0.502	0.836	4	8' 9"	2	0.325	0.595	4	7' 5"
2/0	0.447	0.745	4	8' 3"	4	0.257	0.555	4	7' 3"

TYING GUIDE, SINGLE INSULATOR, ALUMINUM ALLOY OR ALUMINUM TIE WIRE, ACSR CONDUCTOR, ALUMINUM ALLOY, STRAIGHT OR PREFORMED ARMOR RODS

MAY 15, 1973

M40-10



NOTE:

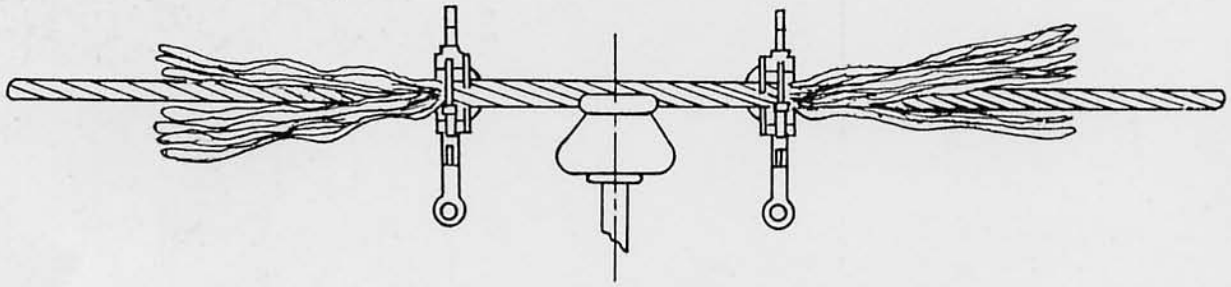
With tape still on one end of rods and other end threaded though wrenches so they open between the same two rods, center on conductor over point of support and close around conductor as shown above. Twist rods enough to give permanent set. Remove tape and slide wrenches half way to ends and repeat. Move wrenches to end of rods and twist. Attach clips and tighten before removing so end of rods will flare after removal. Rods should be twisted snugly with a smooth lay in same direction as lay of conductor. For further information and method of installing rods on angle see manufacturer's instructions for Construction.

CONDUCTOR SIZE	Support	
	Single	Double
	Twists	
4 A.C.S.R. (6Al/1St) & (7Al/1St)	5 - 6	7 - 8
2 A.C.S.R. (6Al/1St) & (7Al/1St)	6 - 7	8 - 9
1/0 A.C.S.R. (6Al/1St)	4 - 5	6 - 7
2/0 A.C.S.R. (6Al/1St)	5 - 6	7 - 8
3/0 A.C.S.R. (6Al/1St)	5 - 6	7 - 8
4/0 A.C.S.R. (6Al/1St)	5 - 6	7 - 8

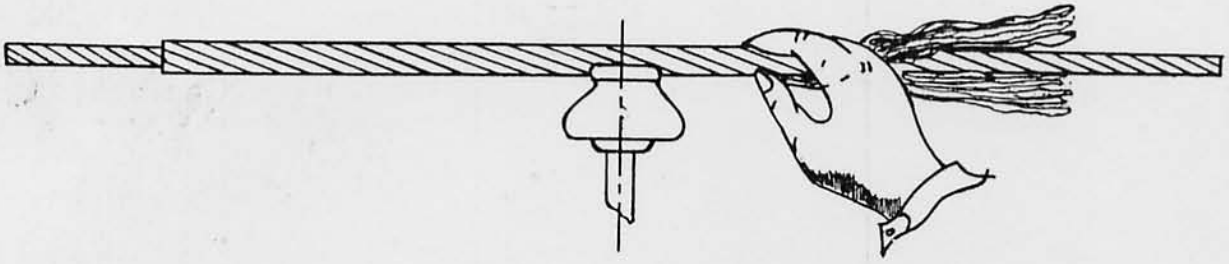
ARMOR RODS
A.C.S.R. CONDUCTOR

MAY 15, 1973

M40-11



For tool application, insert half the reinforcements in one cavity and the other half in the other cavity of the open wrenches, keeping the ends even. Hook wrenches over the conductor and close jaws. Space wrenches approximately one reinforcement pitch apart and twist them in the same direction as the lay of the conductor. Wind each wrench to the end of the reinforcements and remove.



For hand application, hold one or more reinforcements against the conductor with midpoint at the insulator, and rotate in same direction as the lay of the conductor, for three or four inches each side of center. In like manner apply remaining reinforcements to center section. After all have been started, complete the application by a rotary outward wiping motion of the hand. Make certain that the ends snap into place in proper order.

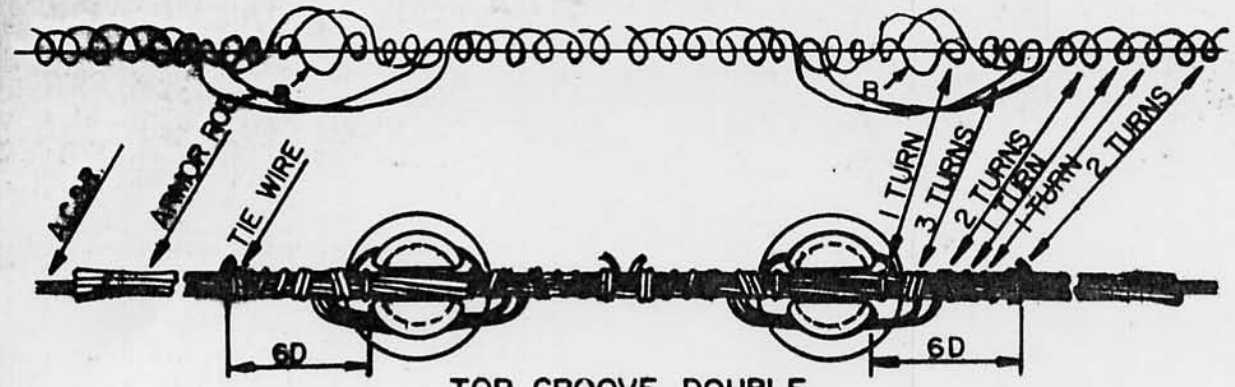
PREFORMED ALUMINUM ALLOY ARMOR RODS

A. C. S. R	LENGTH SINGLE SUPPORT	LENGTH DOUBLE SUPPORT	NO. PER SET	WIRE DIAM. (IN.)	DIAM. PLUS RODS	A.C.S.R.	LENGTH SINGLE SUPPORT	LENGTH DOUBLE SUPPORT	NO. PER SET	WIRE DIAM. (IN.)	DIAM. PLUS RODS
4/0(6x1)	60"	72"	11	.182	.927	2 (7x1)	44"	56"	9	.146	.613
3/0(6x1)	56"	68"	11	.167	.836	2 (6x1)	44"	56"	9	.146	.604
2/0(6x1)	54"	66"	10	.167	.781	4 (7x1)	40"	52"	7	.146	.545
1/0 (6x1)	52"	64"	9	.167	.732	4 (6x1)	40"	52"	7	.146	.538
1(6 x 1)	48"	60"	9	.146	.643						

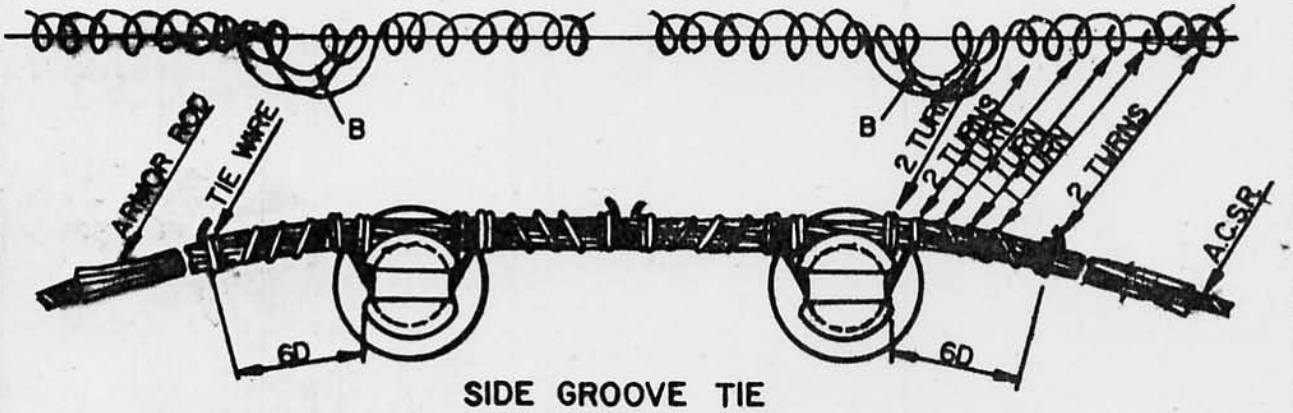
PREFORMED ARMOR RODS
A.C.S.R. CONDUCTORS

MAY 15, 1973

M40-12



TOP GROOVE DOUBLE TIE



SIDE GROOVE TIE

NOTE:

In making ties, start with middle of length of tie wire at position marked "B". To complete tie, cinch up last two turns at each end with pliers until tie wire is snug and tight.

Use the flat face of the pliers against the armor rods.

A. C. S.R		ARMOR RODS	TIE WIRE ALUMINUM		A.C.S.R.		ARMOR RODS	TIE WIRE ALUMINUM	
SIZE	DIAMETER INCHES	"D" DIAM. INCHES	SIZE	LENGTH FEET	SIZE	DIAMETER INCHES	"D" DIAM. INCHES	SIZE	LENGTH FEET
4/0	0.563	0.939	4	9'-3"	1/0	0.398	0.744	4	8'-3"
3/0	0.502	0.836	4	8'-9"	2	0.325	0.595	4	7'-5"
2/0	0.447	0.745	4	8'-3"	4	0.257	0.555	4	7'-3"

TYING GUIDE, DOUBLE INSULATOR, ALUMINUM AND ALUMINUM ALLOY TIE WIRE, A.C.S.R. CONDUCTOR ALUMINUM ALLOY, STRAIGHT OR PREFORMED ARMOR RODS

MAY 15, 1973

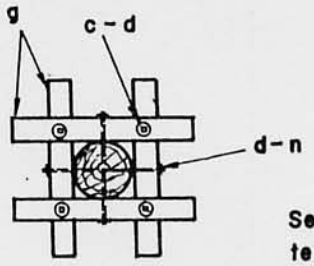
M40 — 17

NOTES:

(1) M41; Select backfill, subject to approval of field engineer.

(2) M41-1; Bogshoe, subject to approval of field engineer.

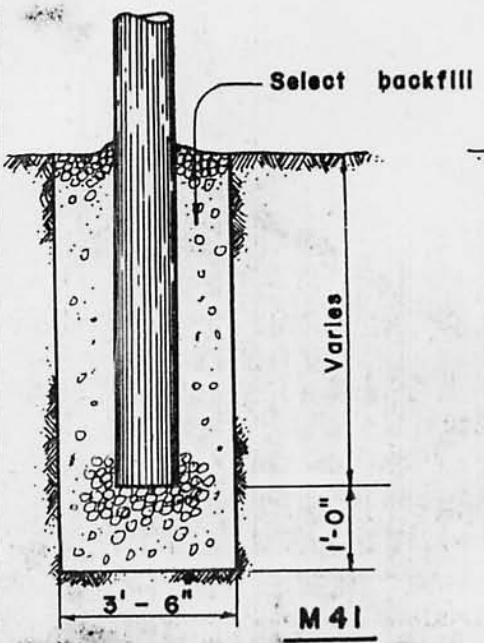
(3) M41 and M41-1 may be used on the same pole in extremely poor soil.



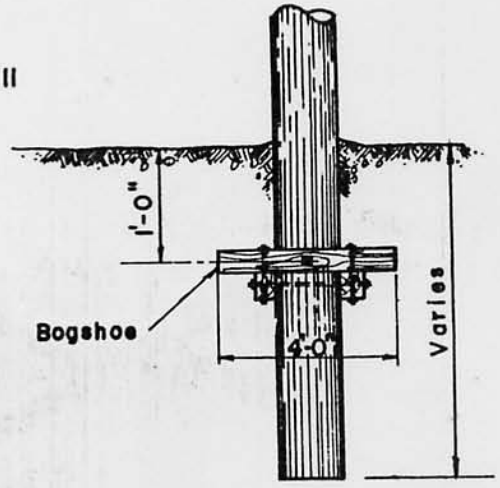
Select backfill to be rock material, 3 inch diameter maximum and enough small stones to fill voids.

Select backfill is used in mud or wet areas where firm tamping is impossible.

A bogshoe is used to keep a pole from sinking vertically as well as to provide stability.



M41



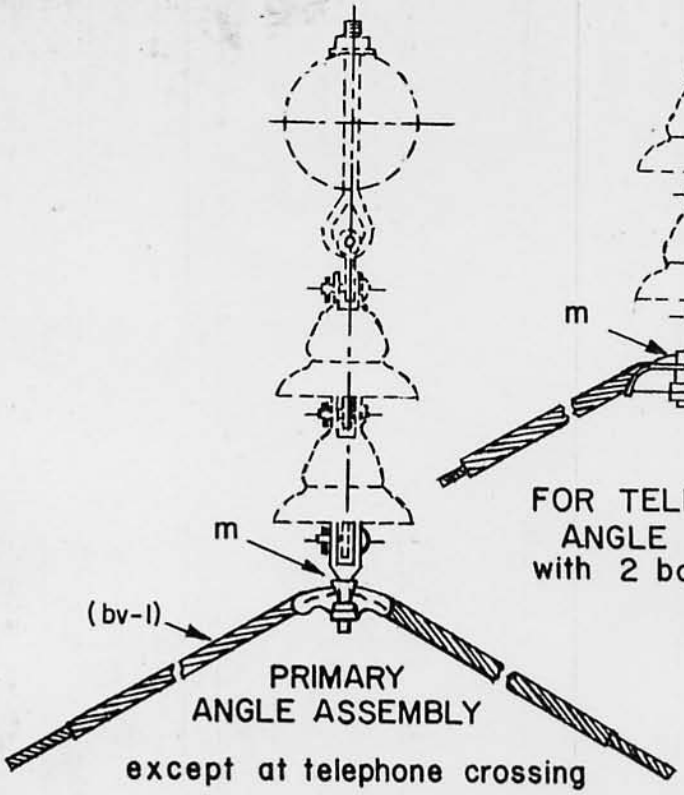
M41 - 1

ITEM	No.	MATERIAL		ITEM	No.	MATERIAL	
c	4	Bolt, Machine 5/8" x 12"		n	2	Bolt, double arming, 5/8" x 22"	
d	12	Washer, square, 2 1/4" x 2 1/4" x 3/16"		—		Select backfill	
		with 13/16" hole					
g	4	Crossarm, 3 5/8" x 4 5/8" x 4'-0"					

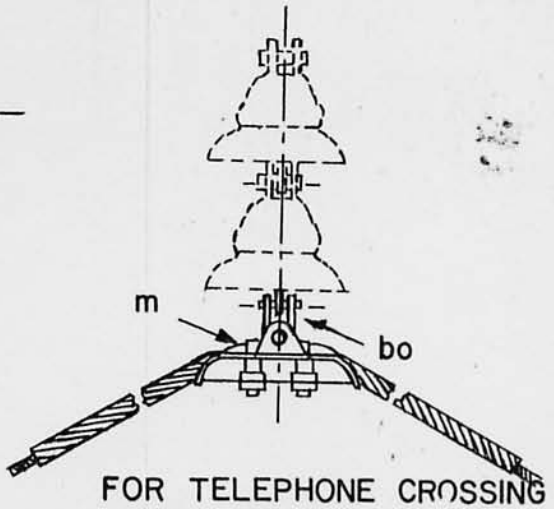
BOG SHOE ASSEMBLY
SELECT BACKFILL ASSEMBLY

Aug. 15, 1974

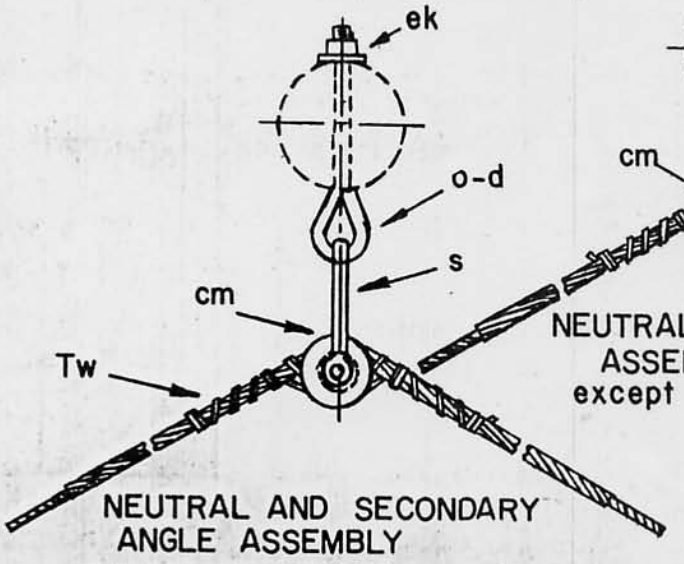
M41, M41-1



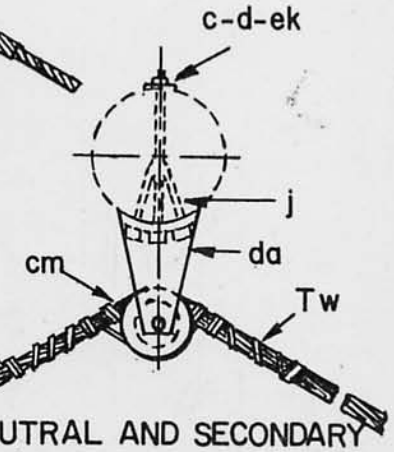
PRIMARY
ANGLE ASSEMBLY
except at telephone crossing



FOR TELEPHONE CROSSING
ANGLE ASSEMBLY
with 2 bolt suspension clamp



NEUTRAL AND SECONDARY
ANGLE ASSEMBLY
except at railroad crossing



NEUTRAL AND SECONDARY
ASSEMBLY
except at railroad crossing

ITEM		MATERIAL
c		Bolt, machine, 5/8" x req'd length
m		Clamp, suspension
n		Bolt double arming
d		Washer, square, 2 1/4"
s		Clevis, secondary, swinging
cm		Spool insulator
bv-l		Armor rod (Single Support) *
		Tie wire *

ITEM		MATERIAL
bo		Shockle, anchor
da		Bracket, insulated
en		Plates, double support
o		Bolt, eye, 5/8" x required length
j		Screw, lag, 1/2" x 4"
ek		Locknuts

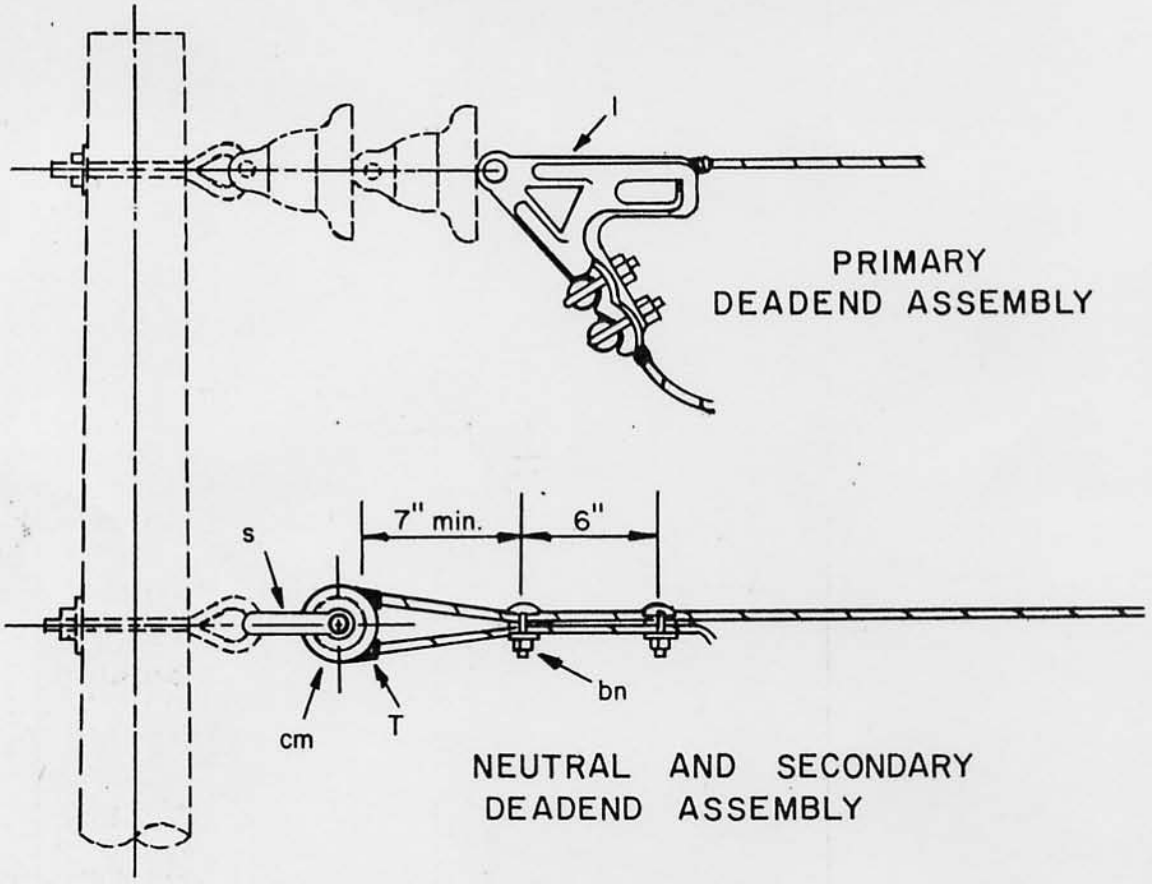
for Accessories

ANGLE ASSEMBLY GUIDE, VERTICAL CONSTRUCTION 30° TO 60° ANGLE, ACSR CONDUCTORS STRAIGHT OR PREFORMED ARMOR RODS

MAY 15, 1973

M41-10

Armor tape required for conductors in galvanized fittings not having aluminum liners.



NOTES:

1. Armor tape wrapping to extend not more than two wraps beyond the mouth of deadend clamp or spool insulator.
2. For 1/0 and 2/0 use spool of 3" min. groove diameter on neutral and secondary deadends.
3. For 3/0 and 4/0 use deadend clamp (see M42-13).

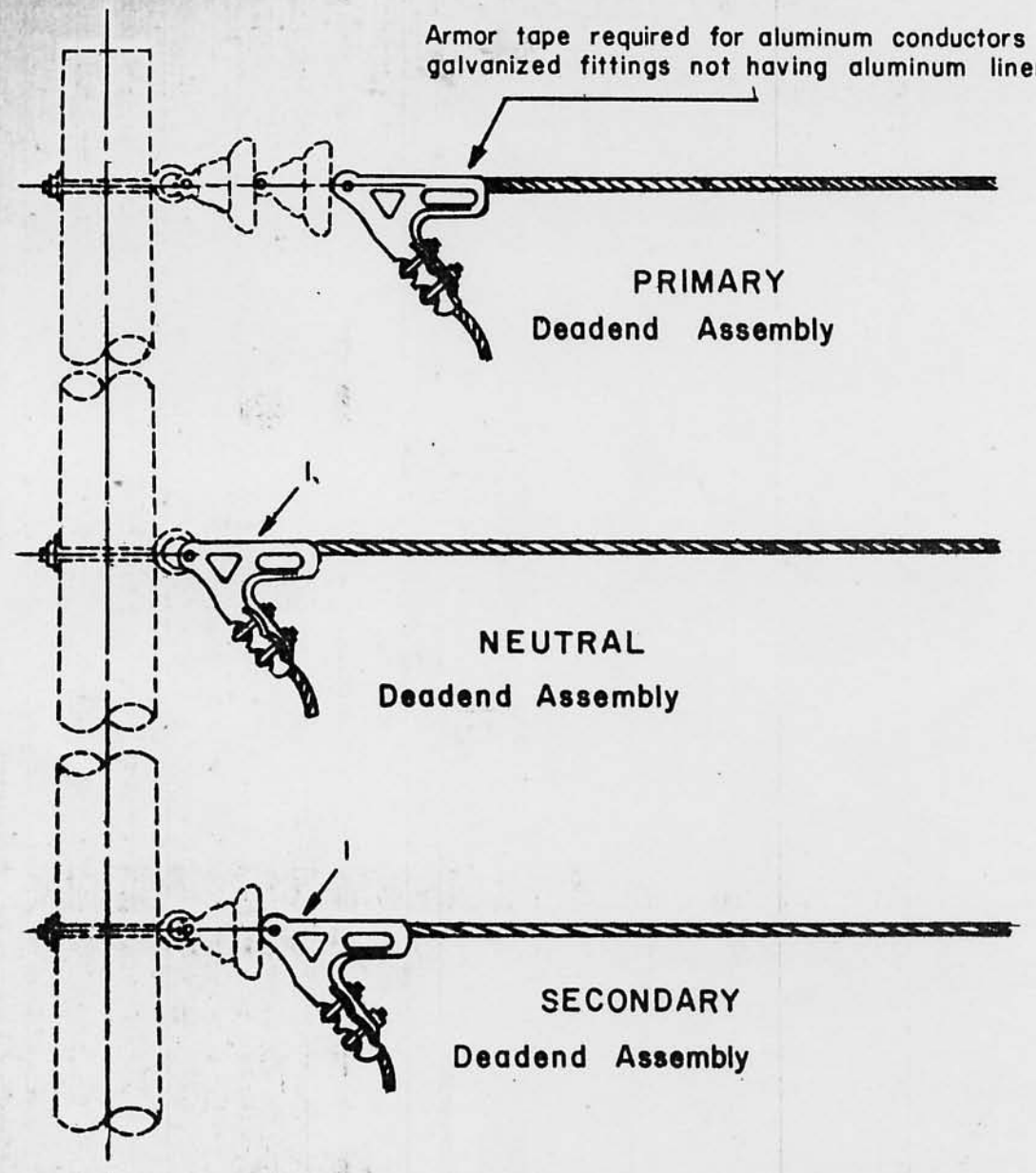
ITEM		MATERIAL	ITEM		MATERIAL
l		Clamp, deadend	cm		Spool insulator
s		Clevis, secondary, swinging	T		Armor tape *
bn		Clamp, loop deadend			

* Conductor Accessories

DEADEND ASSEMBLY GUIDE
DEADEND CLAMP METHOD
A.C.S.R. CONDUCTOR

MAY 15, 1973

M42-11

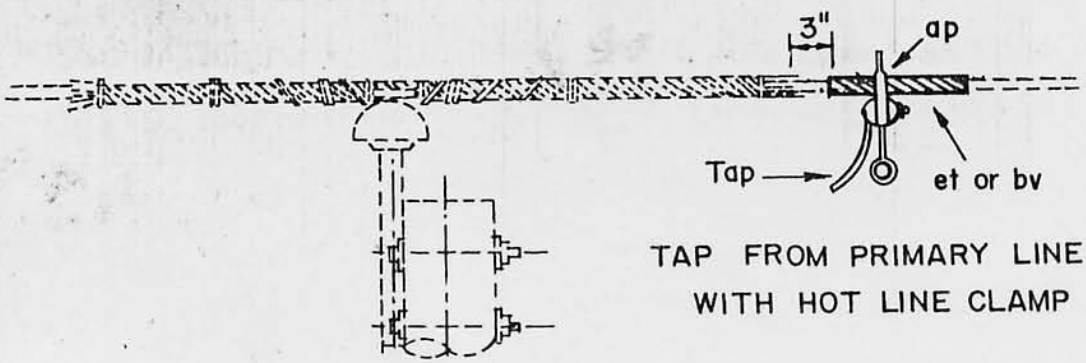


ITEM		MATERIAL	ITEM		MATERIAL
1		Clamp, deadend			

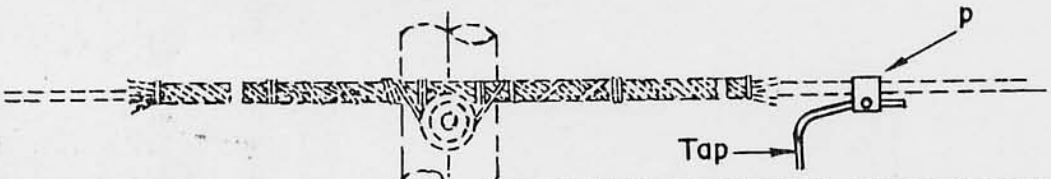
DEADEND ASSEMBLY GUIDE (LARGE CONDUCTORS)

MAY 15, 1973

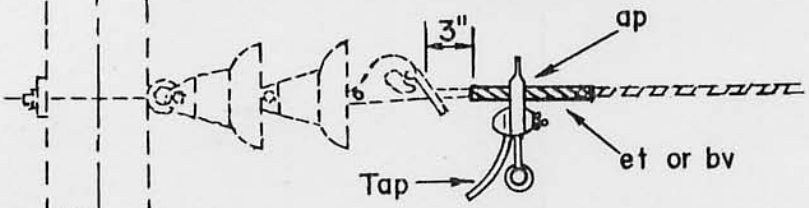
M42-13



TAP FROM PRIMARY LINE
WITH HOT LINE CLAMP

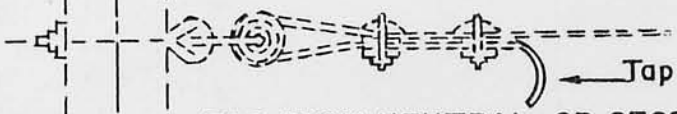


TAP FROM NEUTRAL OR SECONDARY LINE WITH CONNECTOR



TAP FROM PRIMARY DEADEND WITH HOT LINE CLAMP

For tap without hot line clamp omit tap saddle and extend pigtail.



TAP FROM NEUTRAL OR SECONDARY DEADEND

Notes:

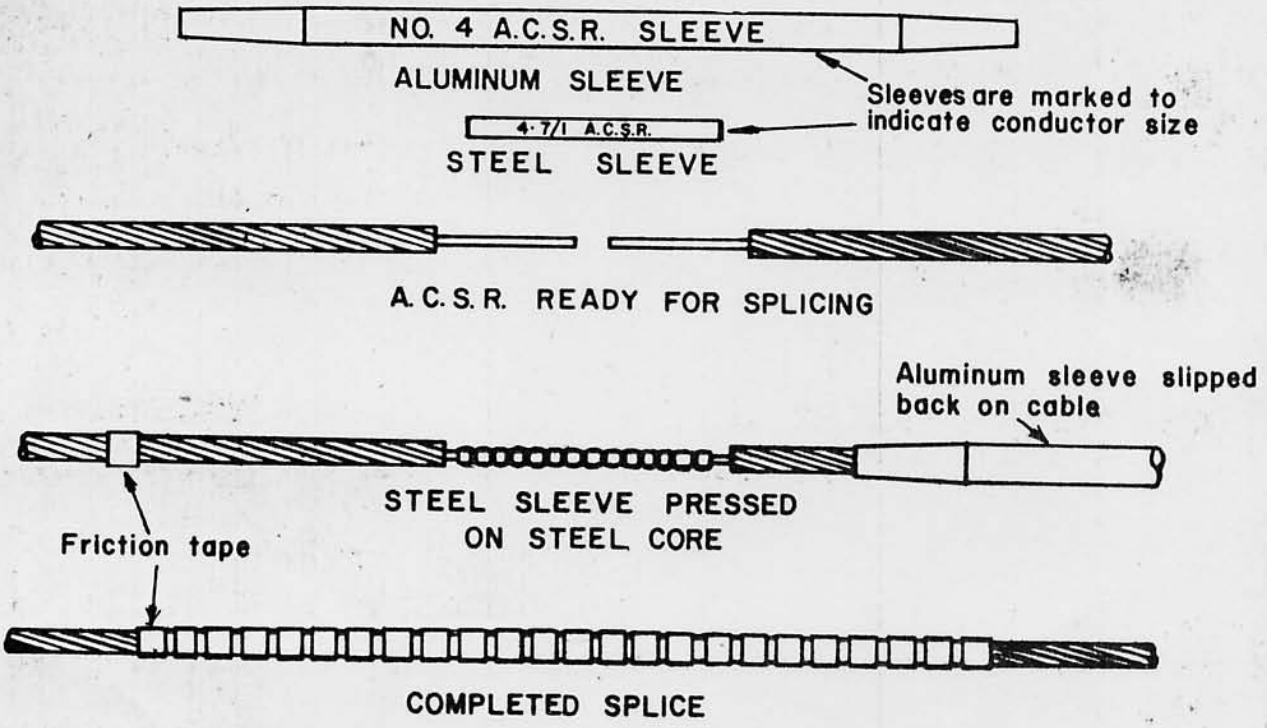
1. Wire brush conductor thoroughly before applying tap saddle.
2. On new construction, tap may be made directly over armor rods provided conductor is thoroughly cleaned and inhibitor used before installing rods.
3. Tap armor rods may be substituted for tap saddle provided conductor is wire brushed thoroughly and inhibitor is used before installing rods.

ITEM	NO. REQR.	MATERIAL			MATERIAL
p		Connector	et		Tap saddle
ap		Clamp, hot line, tap assembly	bv		Armor rod, tapping

TAP ASSEMBLY GUIDE FOR A.C.S.R. CONDUCTORS

MAY 15, 1973

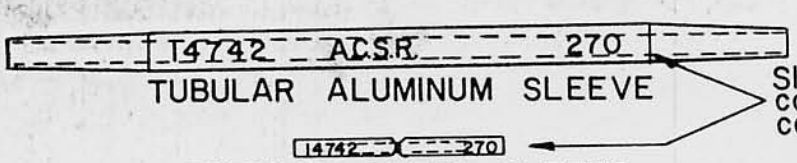
M43-10


NO. 4 A.C.S.R. SLEEVE
ALUMINUM SLEEVE
Sleeves are marked to indicate conductor size
4·7/1 A.C.S.R.
STEEL SLEEVE
A. C. S. R. READY FOR SPLICING
Aluminum sleeve slipped back on cable
STEEL SLEEVE PRESSED ON STEEL CORE
Friction tape
COMPLETED SPLICE

DIRECTIONS FOR MAKING A.C.S.R. SPLICE

1. Slip Aluminum Sleeve on cable far enough back to be out of the way. Cut back Aluminum Strands at end of cable 3/8" more than half the length of steel sleeve.
2. Insert steel core wire in the steel sleeve and press with inner groove of tool Press entire length of sleeve starting at the middle and working toward the ends. Leave about 1/16" space bet. presses.
3. Straighten steel sleeve by hammering carefully against a suitable block.
4. Place a piece of friction tape on the cable to mark the position of the end of the Aluminum sleeve such that it will be centered on the splice.
5. Clean conductor by wire brushing, paint the steel sleeve and the adjacent cable that will be covered by the aluminum sleeve, with a suitable corrosion inhibitor.
6. Slip the Aluminum sleeve in place and press in place with the outer groove of tool using the same procedure as with the steel sleeve.
7. Straighten entire splice by hammering carefully against a suitable block.
8. Splice shall not be within 10 feet of insulator

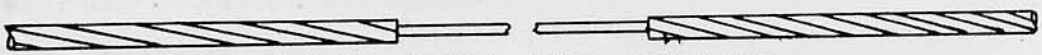
SPLICING GUIDE - COMPRESSION TYPE A. C. S. R. CONDUCTOR		
MAY. 15, 1973		M45-21



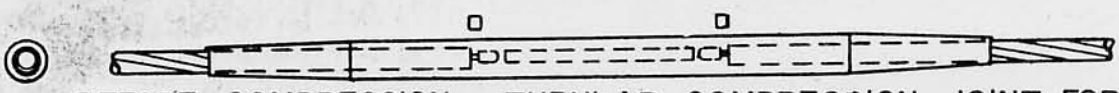
TUBULAR ALUMINUM SLEEVE

Sleeves marked for conductor size and catalog number

TUBULAR STEEL SLEEVE



A.C.S.R. READY FOR SPLICING



BEFORE COMPRESSION — TUBULAR COMPRESSION JOINT FOR A.C.S.R.

AFTER COMPRESSION — TUBULAR COMPRESSION JOINT FOR A.C.S.R.

METHOD OF APPLYING TUBULAR COMPRESSION JOINT

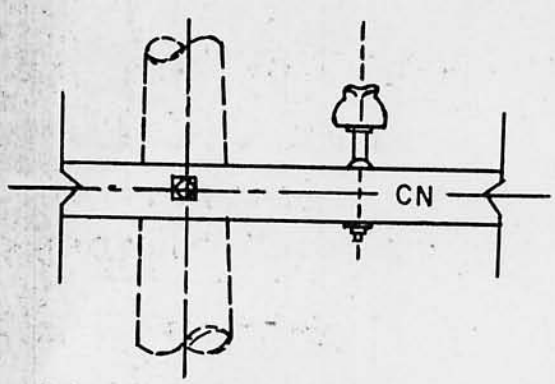
Caution: Before applying make sure the bores are thoroughly clean.

1. Slip the aluminum compression sleeve over one cable end and back it out of the way along the cable.
2. Using a hack saw, cut off the aluminum strands from each cable end, exposing the steel core for a distance of about 3/8" more than half the length of the steel compression sleeve. Use care not to nick the steel core with the saw. Before cutting serve the cable with wire just back of the cut.
3. Insert the steel core ends into the steel compression sleeve, making sure that the ends are jammed against the stop in the middle of the sleeve.
4. Compress the steel sleeve over its entire length, using the proper size compression dies making the first compression at the center and working out to the ends, allowing dies to always overlap their previous position.
5. Remove serving from the cable, clean conductor by wire brushing and slip the aluminum sleeve over the steel joint. Center the aluminum sleeve by sighting the ends of the steel joint through the filler holes provided in the aluminum sleeve.
6. Using pressure gun equipped with tapered nozzle, inject corrosion inhibitor through both holes in the aluminum sleeve until the space between it and the steel joint is completely filled. This can be observed through the filler holes. The nozzle of the pressure gun should be jammed tightly in the filler holes to prevent the paste from oozing back during injection.
7. Insert the plugs in the filler holes and hammer them firmly in place. They will be securely locked in, compressing the aluminum joint.
8. Compress the aluminum sleeve, using the proper size dies. Make the first two compressions with the inner edges of the dies matching the positions stencilled on the aluminum sleeve. Make additional compressions advancing to ends, allowing dies to always overlap previous position.

SPLICING GUIDE – COMPRESSION TYPE
A.C.S.R. CONDUCTORS 2/0, AND LARGER
1/0 OPTIONAL

MAY 15, 1973

M45 – 22

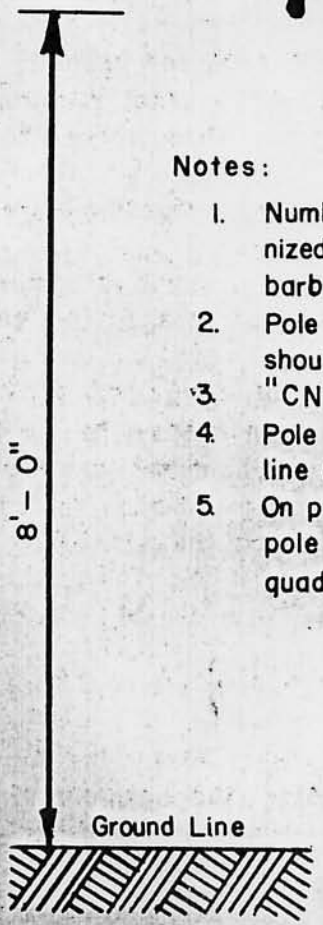


M52-4

May be placed
1A
23
instead of as shown

1A23

M52-3

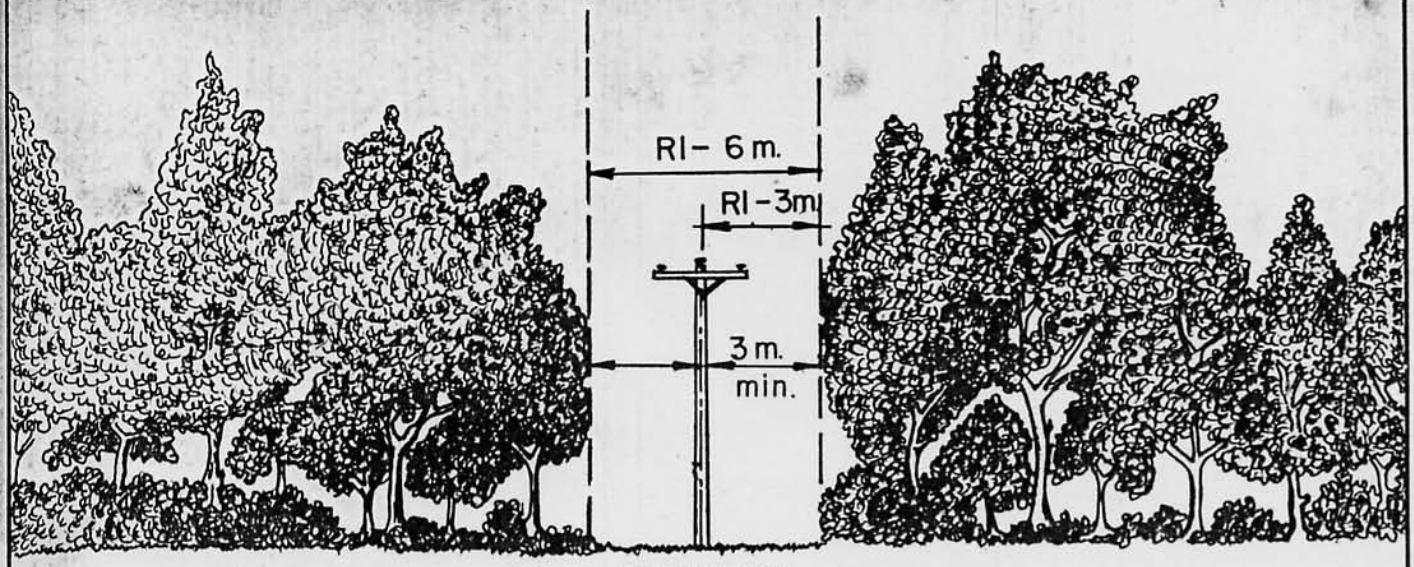


Notes:

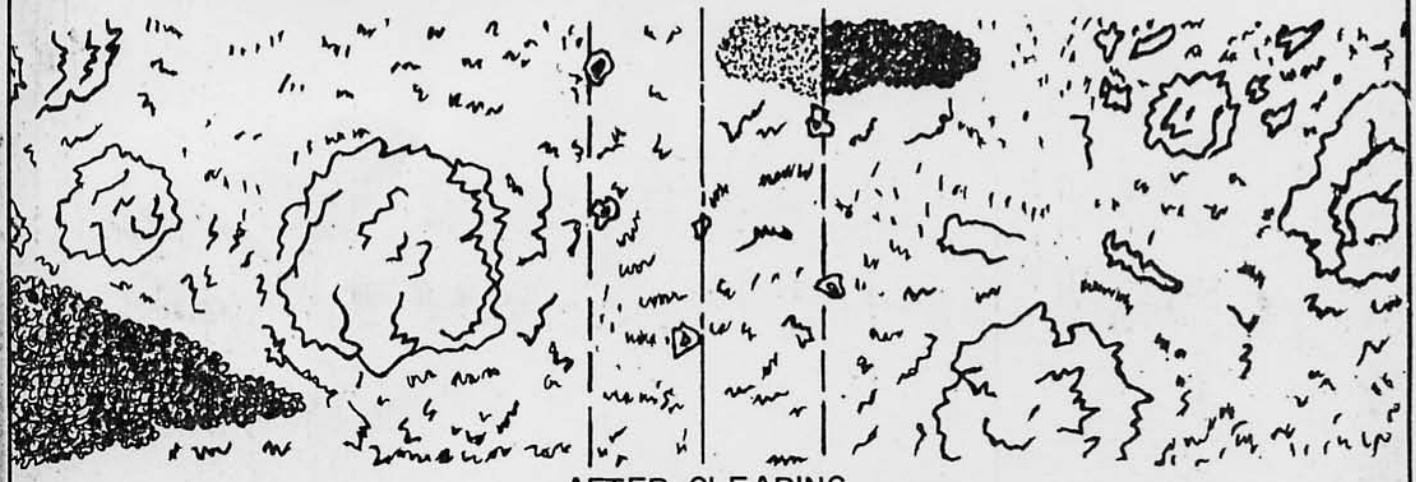
1. Numbers and letters shall be of cutout aluminum or electrogalvanized soft steel, fastened to pole with galvanized or aluminum, barbed 1" round head nails.
2. Pole legends to be 1-1/2" to 3" high. If 3" characters are used, should be placed vertically instead of as shown.
3. "CN" to be 2" high.
4. Pole to be staggered 30° from direct facing highway. When line crosses highway or R.R., legend should face same.
5. On poles having limited climbing space due to special equipment, pole legend should be so located as to leave climbing space quadrant unobstructed.

NEUTRAL IDENTIFICATION AND POLE NUMBERING GUIDE

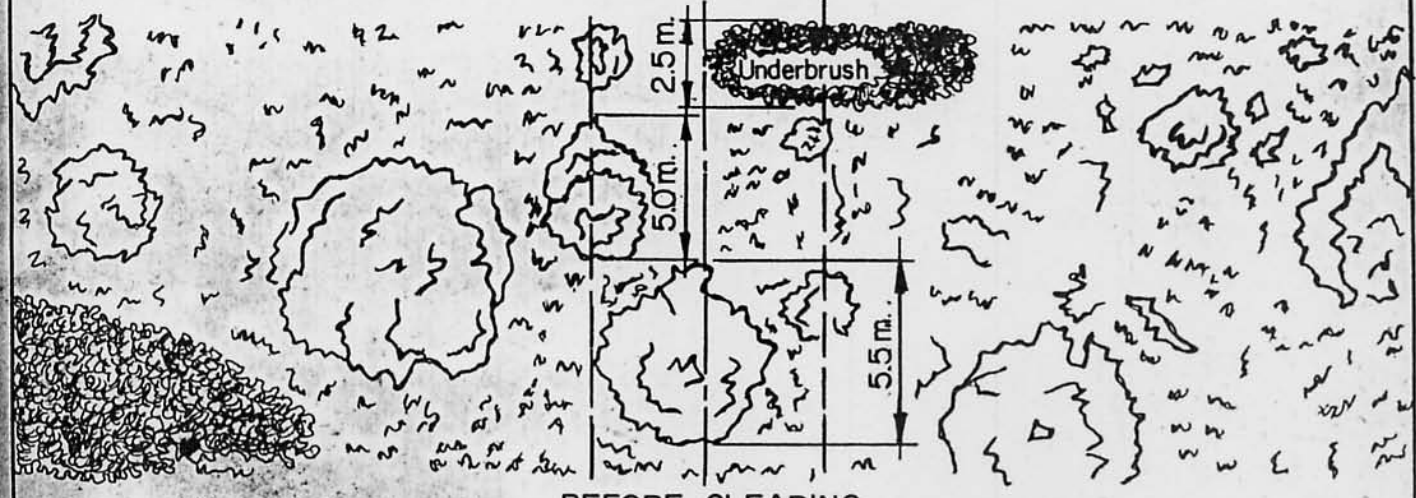
MAY 15, 1973		M52-3, M52-4



ELEVATION



AFTER CLEARING

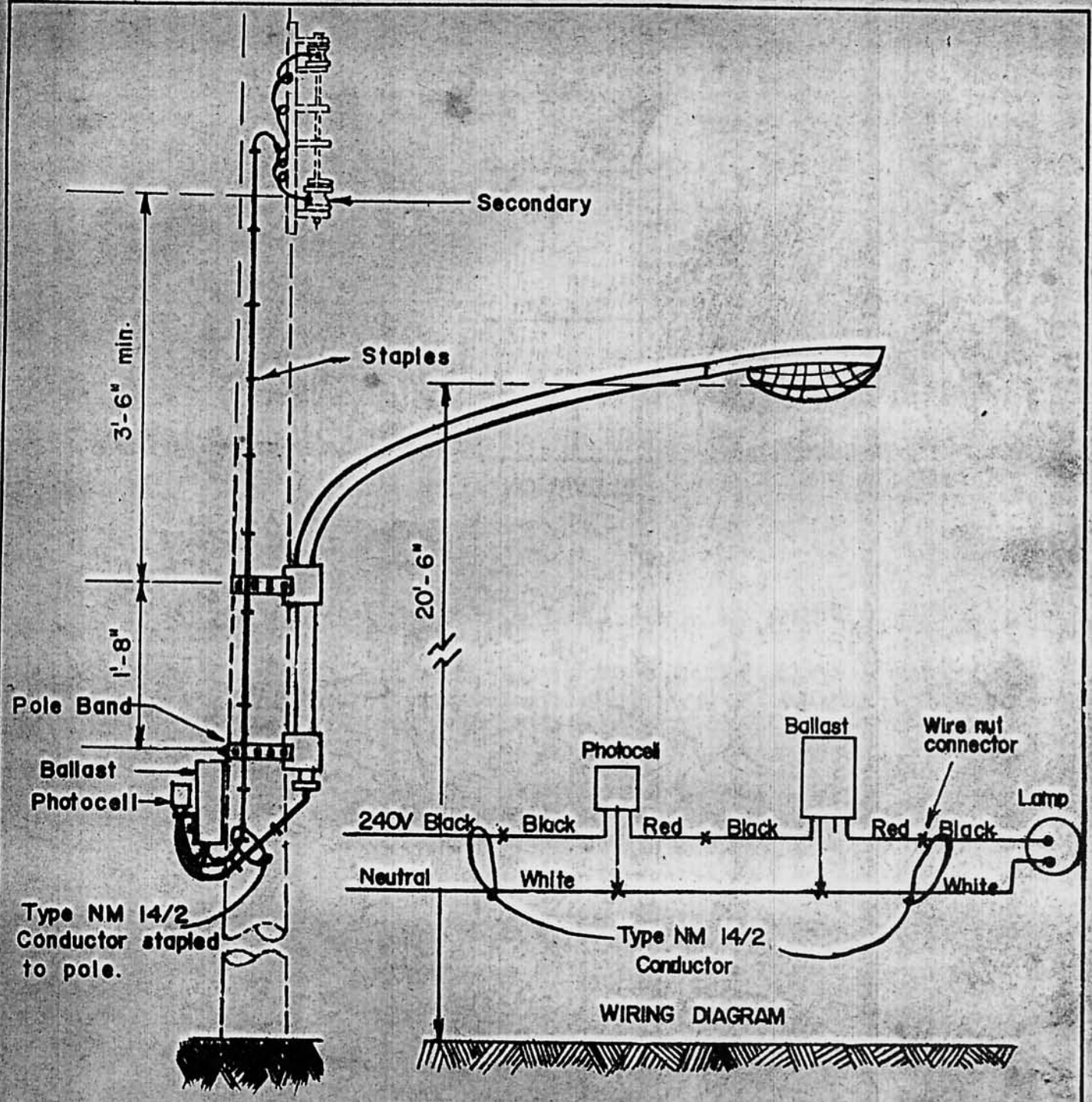


BEFORE CLEARING

CLEARING RIGHT-OF-WAY GUIDE

MAY 15, 1973

R1



NOTE:

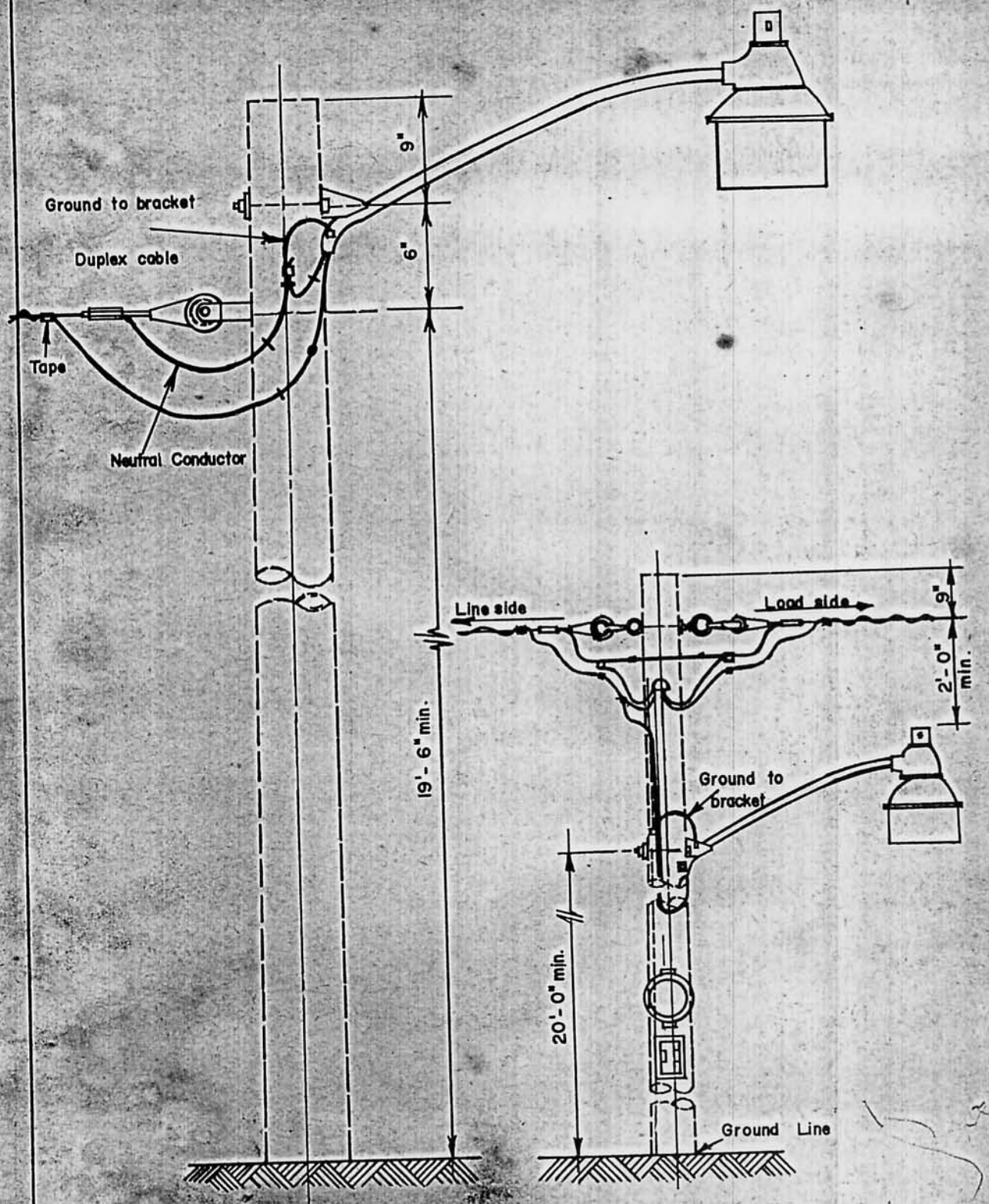
Ground Street Light Bracket

ITEM	No.	MATERIAL
	1	Luminair
	1	Lamp
	1	Bracket, street light
	2	Pole band, steel strap
	1	Ballast
	1	Mounting lug for ballast
	12'	Wire, #14 AWG, 2/C NM PDX
	2	Connector, Comp. 6-4 to 8-14
	1	Photocell
	4	Connector, insul wirenuts
	12	Staples, insulated, 7/8"

REPACOM STREET LIGHT INSTALLATION GUIDE

May 15, 1973

SLI



SECURITY LIGHT INSTALLATION GUIDE (UNMETERED)

SL2